Comment Summary Document

Approach to Reinventing Regulations of Storing Mixed Low-Level Radioactive Waste; Advance Notice of Proposed Rulemaking (ANPR)

Published March 1, 1999
(Volume 64, Number 39)

RCRA Docket: F-99-MLLP-FFFFF

U.S. Environmental Protection Agency
September 21, 1999

****** DRAFT DOCUMENT (REV. 1) - DO NOT CITE OR DISTRIBUTE ******

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

Section **Page**

1. INTRODUCTION

On March 1, 1999, we published an advance notice of proposed rulemaking (64 **FR** 10063) for three reasons. First, we wanted to introduce potential strategies which were under consideration for making our regulations more flexible for generators that treat and/or store low-level mixed waste (LLMW) on site. Second, we asked members of the regulated community and general public for feedback on our strategies and whether we should consider other approaches for providing relief from the dual regulation of mixed waste. Lastly, we asked LLMW generators to provide us with additional information on the volumes, composition, and management practices (including procedures and associated costs of treatment and storage) of their mixed waste.

We received comments from 69 commenters who represented the following types of entities:

- Academia (11)
- Commercial Treatment, Storage, and Disposal Facilities (TSDFs) (2)
- Contractors and Vendors (5)
- Federal Agencies (6)
- Hospitals and Medical Institutions (8)
- Industrial Users (3)
- Nuclear Power Industry (11)
- General Public (1)
- State Governments (12)
- Trade Groups/Law Firms (10)

The vast majority of the commenters supported the concept of providing regulatory flexibility to generators of LLMW (87%). Many of these commenters made suggestions for either increasing or decreasing the level of flexibility and degree to which EPA should remain involved in the implementation and enforcement of any conditional exemption. Four other commenters (6%) also provided similar suggestions for improving the effectiveness of the proposed approaches, but remained silent as to whether they supported the overall concept. The remaining five commenters (7%) opposed EPA's concept for various reasons.

2. APPROACH FOR SIMPLIFYING DUAL REGULATION: CONDITIONAL EXEMPTION FOR STORAGE

2.1 Scope of Exemption

We heard from 47 commenters regarding the scope of the conditional exclusion for the on-site storage of LLMW at nuclear power plants (Commenter Nos. 1, 3, 5, 7, 8, 12-14, 16-19, 22, 23, 27-39, 42-44, 46, 47, 48, 51-54, 57, 58, 60, 62, 63, 65-67, 71, and 72). All of these commenters supported the concept of allowing nuclear power plants to store LLMW onsite; however, comments regarding the scope of facilities (location and type), waste types, and regulatory status of exempt waste covered by the conditional exclusion were made.

2.1.1 Facility Locations

Comment: Six commenters questioned EPA's limiting of the conditional exclusion to on-site storage and suggested that the conditional exclusion be extended to wastes stored "off-site" (Commenter Nos. 1, 16, 39, 44, 52, and 66). Specifically, two commenters noted that the "on-site" condition would prevent them from using off-site storage facilities that they owned and operated even though these facilities were properly configured for waste storage (Commenter Nos. 1 and 52). One of these commenters noted that EPA's recent "Military Munitions" rule allowed waste transport to centralized locations and urged EPA to allow transport of LLMW to centralized locations (Commenter No. 52). A third commenter noted that EPA's definition of "site" should follow the NRC convention in which non-contiguous areas on the same license are considered as a single site to allow for transport of waste from one location to another, provided both locations are included in the same NRC or Agreement State license (Commenter No. 44). The fourth commenter noted that the conditional exemption should be extended to off-site facilities storing (and treating) commercial mixed wastes because the NRC regulatory framework that is sufficient to address on-site storage (and treatment) is also sufficient for the storage (and treatment) of these same wastes offsite, provided the off-site facility meets the conditions of the conditional exemption (Commenter No. 66).

Two other commenters stated that the scope of the conditional exemption for storage also should be expanded to include "off-site" storage by material licensees (Commenter Nos. 1 and 39). One of these commenters noted that LLMW that is generated at laboratory locations is transferred to consolidation points (satellite accumulation areas) and then shipped to the facility's own off-site permitted facility (Commenter No. 1). This commenter also noted that waste being stored in the satellite accumulation areas is subject to limited RCRA oversight, and as such, no clock is running on storing the waste in these locations, which are typically not especially designed or monitored to provide significant protections for long-term storage. This commenter concluded that bringing the waste to a storage facility that is specifically designed for longer term storage and is regularly inspected: (1) is a better storage option; (2) is supported by the proposed conditional exemption; and (3) "clearly meets the 'on-site' language of the proposed exception."

2.1.2 Facility Types

<u>Nuclear Power Plants</u>

Comment: We heard from seven commenters that specifically supported the conditional exemption for storage of LLMW at nuclear power plants (Commenter Nos. 17, 27, 33, 42, 51, 54, and 67). Three of these commenters noted that (1) there are few LLMW treatment technologies and limited LLMW disposal facilities that are both permitted (RCRA) and licensed (NRC), and (2) for certain mixed wastes, there is insufficient treatment or disposal capacity (if any at all). As a consequence, some electric utilities have been required to store mixed wastes for indefinite periods of time, which is prohibited under the RCRA Section 3004(j) land ban storage prohibition. These commenters believed that the proposed conditional storage exemption is a

much needed step towards a cost-effective regulatory program that continues to protect human health and the environment without imposing unnecessary duplicative regulations (Commenter Nos. 33, 42, and 51).

Comment: One commenter requested that EPA clarify the terminology used in the ANPR, specifically with regard to the terms "nuclear power industry" and "nuclear power plants" (Commenter No. 66). The commenter stated that the terms are used interchangeably in the ANPR, and that "nuclear power plant" may be perceived as simply a reactor, and not an entire facility.

Material Licensees

Comment: We heard from 34 commenters that believed the scope of the conditional storage exemption should be expanded beyond nuclear power plants to include all material licensees that have either an NRC or Agreement State license for LLW (Commenter Nos. 1, 3, 5, 7, 8, 12-14, 16, 17, 23, 27, 29, 32-34, 38, 39, 42- 44, 46, 47, 51-54, 57, 60, 63, 65, 66, 71, and 72) for numerous reasons. First, one commenter believed that the type of generator (i.e., nuclear power facility *vs*. non-power nuclear facility) was an inappropriate criterion for determining whether stored LLMW qualifies for a conditional exemption (Commenter No.16). The commenter noted that, as the ANPR explains (p.10065, col.2), the court held in Military Toxics Project *vs*. EPA, 146 F. 3rd 948 (D.C. Cir.1998), that where a waste might pose a hazard only under limited management scenarios, and other regulatory programs already address such scenarios, EPA is not required to classify that waste as hazardous waste subject to regulation under RCRA Subtitle C. The commenter also stated that LLMW in storage poses a hazard only under management scenarios in which releases of the LLMW from the storage unit would be likely. Therefore, if EPA determines that a non-RCRA regulatory program (e.g., NRC or Agreement State licensing program), either alone or in combination with other legally imposed requirements, addresses such scenarios for LLMW in storage, then EPA is not required to classify the stored LLMW as hazardous waste. The commenter also believed that, when LLMW is stored subject to a NRC or Agreement State license, the management scenarios under which the stored LLMW might be released to the environment may be addressed in the manner suggested by the court in Military Toxics Project *vs*. EPA (without imposing requirements that restrict the industry, company, or facility that generates such LLMW). The commenter suggested that EPA would be justified in allowing LLMW to qualify for an exemption from regulation as hazardous waste under RCRA Subtitle C, provided that it is stored in a unit covered by a valid NRC or Agreement State license, and provided that other conditions, which protect against releases, are met, especially since NRC and Agreement State licensing programs already protectively address LLMW management scenarios that might otherwise produce risks to human health or the environment (Commenter No.16).

Second, one commenter noted that although there are different levels of regulatory oversight established by the NRC, especially with respect to nuclear power plants, such differences reflect other considerations or safety concerns rather than just storage issues. The NRC (and Agreement

States) has established a graded system of licensing that reflects the quantity of licensed materials possessed and the capabilities of the licensee's organization; therefore, all licensees are able to safely store the LLMW that they generate (Commenter No. 43).

Third, several commenters noted that nuclear power plants are not the only facilities with staff responsible for ensuring that LLMW is properly managed (Commenter Nos. 7, 16, 23, and 34). One of these commenters believed that the ANPR discussion of whether the NRC regulations assert more direct control over commercial nuclear power plants than over other LLMW generators because Radiation Safety Officers (RSO) and on-site Resident Inspectors (RI) are required at nuclear power plants implied that, unless a LLMW storage unit is located at a facility required by its NRC or Agreement State license to have a RSO and on-site RI, the unit is somehow not deserving of regulatory flexibility (Commenter No. 16). This commenter questioned whether this allegation was supported. This commenter also believed that the requirements of a NRC or Agreement State license in conjunction with certain other legally imposed requirements would adequately address management scenarios in which releases of the LLMW from a storage facility would be likely to occur, regardless of whether or not the license required a RSO and/or RI. Hence, the commenter did not believe it was necessary for EPA to restrict applicability of a conditional exemption from RCRA hazardous waste requirements for LLMW storage solely to LLMW in on-site storage at nuclear power plants. Instead, the commenter urged EPA to develop a conditional exemption applicable to LLMW being stored under provisions of a license issued by the NRC or an Agreement State, regardless of either who generates the waste or if the waste is stored onsite or off-site (Commenter No. 16).

In a similar vein, two commenters (representing universities) stated that like nuclear power plants, they also had a RSO at each of their campuses (Commenter Nos. 7 and 34). These commenters noted that the NRC Agreement States have been highly effective in ensuring that all radioactive waste (including mixed waste) is subject to safe storage, handling, and disposal, and that adequate safeguards for handling radioactive materials and waste are in place that are analogous to those employed in the nuclear power industry. These commenters, therefore, believed that EPA should extend whatever regulatory relief it provides to nuclear power plants to other mixed waste generators. A third commenter pointed out that although material licensees do not have RIs, many of them have multiple people overseeing the management of LLMW (Commenter No. 23). This commenter noted that their facility has a RSO, a Chemical Waste Manager, Assistant Director, and Department Director, all of whom which have some degree of responsibility for the management of LLMW.

Fourth, two commenters believed that the scope of the conditional exclusion for storage should be expanded to specifically include universities (Commenter Nos. 25 and 26). One of these commenters noted that universities, and especially those that are state institutions: (1) have the financial and technical wherewithal to manage LLMW safely; (2) are stable and long-term organizations; (3) are not-for-profit institutions and lack the financial motivation of private companies for mismanagement of LLMW; and (4) in the event of an accident, the state would be the responsible party should the institution be closed (Commenter No. 25).

Fifth, a group of commenters stated that the exemption should apply to all generators of LLMW because wastes of similar chemical, radiological, and physical characteristics should be regulated in the same manner, without regard to their origin (Commenter Nos. 13, 44, and 57). One of these commenters noted that a container of tritiated acetonitryl is no more hazardous in an industrial research laboratory than in a university laboratory and should be regulated no differently for this reason (Commenter No. 44).

Lastly, five commenters noted that non-reactor facilities generate most of the mixed waste in the United States and are faced with the same compliance and management issues as reactor facilities; therefore, these facilities would benefit from the relief afforded by the proposed approach and should be allowed to manage their LLMW as envisioned in the ANPR (Commenter Nos. 5, 29, 32, 38, and 53). Two of these commenters noted that small research facilities and universities have limited budgets and generate relatively small volumes of LLMW; therefore, it was not economical for them to become a permitted TSDF for the amounts of LLMW that they generate (Commenter Nos. 29 and 32). A third commenter pointed out that the non-reactor mixed waste generators are just as astute and capable of safely managing their mixed waste as the reactor generators (Commenter No. 38). One commenter urged the Agency to extend the conditional exemption for storage to material licensees; however, the commenter believed that the conditional exemption should apply only to areas where wastes are managed safely and mismanagement is unlikely (Commenter No. 32).

We also heard from three commenters that believed that the scope of the conditional exemption for storage should not be expanded beyond nuclear power plants (Commenter Nos. 19, 58, and 61). One of these commenters stated that there is a lack of direct regulatory control by the NRC over hospitals, laboratories, research facilities, pharmaceutical companies, or other mixed waste generators, and that there is no guarantee that the NRC rules would be imposed on such sources of LLMW (Commenter No. 61). This commenter also noted that a change in NRC rules, once the conditional exemption was in place, could weaken the basis for granting such an exemption. The other two commenters stated that the exemption should be limited to nuclear power plants until more experience with licensees is gained because (1) nuclear power plants generally maintain a higher degree of control over their activities, including mixed waste storage than other licensees, and (2) most of the data upon which the ANPR was based on were from nuclear power plants (Commenter Nos. 19 and 58).

Comment: A group of commenters noted that the conditional exemption for storage would be much more preferable than the conditional exemption for decay-in-storage approach also being considered by the Agency (Commenter Nos. 23, 26, 34, 52, 53, and 71). Two of these commenters stated that they needed to be able to store long-lived isotopes (e.g., those with half-lives longer than 65 days, but less than 120 days) beyond the time frames envisioned by the Agency in its proposed decay-in-storage approach. One of these commenters noted their institution was licensed both to use more than 200 different radionuclides and to decay-in-storage radionuclides with half-lives less than 120 days. This commenter believed that the Agency's contemplated decay-in-storage exemption would be unwieldy because each of these radionuclides

(and newly generated waste container) would have a different starting time for its RCRA storage period (i.e., after exactly 10 half-lives) (Commenter No. 52).

Four other commenters believed that the conditional exemption for storage should be expanded to allow generators to store LLMW with longer half-lives for up to one year at the generator's storage area(s) (Commenter Nos. 26, 34, 52, and 53). Two of these commenters noted that small quantities of LLMW containing tritium and carbon-14 (long half-life isotopes) were often generated in biomedical research and, that under current regulations, these wastes must be shipped for disposal, at premium prices, every 90 days (Commenter Nos. 26 and 34). These commenters stated that they would prefer to move the waste out of laboratory satellite accumulation areas to hazardous waste storage areas, because the hazardous waste storage areas are considered safer for the proper storage of the waste (and prevents build-up of small waste containers in laboratories). The commenters believed that they could obtain significant financial relief if they were able to store the wastes for up to one year. (One of these commenters noted that disposal costs for these LLMW range from approximately $250 to $750 per gallon, with a fifteen-gallon minimum order; therefore, it is very expensive to dispose of this waste on a 90-day time schedule especially when they only generate fifteen gallons of this type of waste in a single year (Commenter No. 26). The third commenter suggested that EPA could extend the conditional exemption to non-decay-in-storage material by classifying generators by their LLMW generation rates (Commenter No. 53). For example, a facility may be a large quantity generator for RCRA purposes, but a small quantity generator for LLMW waste purposes. This classification would allow a facility to take advantage of the extended accumulation times (with appropriate storage quantities and time limitations) available for small quantity generators and conditionally exempt small quantity generators under RCRA. It would potentially allow storage beyond 90-days for LLMW under the conditional exemption, consolidating shipments and reducing LLMW disposal costs. The fourth commenter suggested that EPA could propose a conditional exemption that would allow 270 days of accumulation for up to 10 kilograms of LLMW (Commenter No. 52). Lastly, one commenter recommended that EPA should allow waste that could not be stored for decay due to high activity, remain onsite for a period of time to allow sufficient accumulation to make disposal economically feasible (Commenter No. 23).

Commercial Treatment, Storage, and Disposal Facilities

Comment: We received comments specifically supporting the extension of the conditional exemption for storage to commercial treatment, storage, and disposal facilities (TSDF) from 16 commenters (Commenter Nos. 16, 17, 27, 29, 31-33, 37, 39, 46, 51, 54, 63, 65, 66, and 71). One of these commenters stated that facilities that provide storage services to mixed waste generators should be allowed to qualify for a conditional exemption or other relief, if such facilities are licensed by the NRC or an Agreement State and meet all other conditions of exemption (Commenter No. 16). The commenter stated that EPA would be justified in allowing LLMW to qualify for an exemption from regulation as hazardous waste under RCRA Subtitle C, provided that it is stored in a unit covered by a valid NRC or Agreement State license, and provided that other conditions, which protect against releases are met. The commenter concluded

that it should not matter whether the licensed storage unit is located at a facility that provides storage services to mixed waste generators with whom they contract and by whom they are paid, unless EPA has evidence that the likelihood of LLMW releases from licensed storage units at such facilities is greater than from other licensed storage units. A second commenter stated that facilities that accumulate, store, treat, and dispose of LLMW should be exempt from regulation under RCRA and that the exemptions should not be limited specific industries, whether on-site or off-site (Commenter No. 39). A third commenter stated that the conditional exemption should be extended to all NRC and Agreement State holders of a specific license, as defined in 10 CFR 30.31, and would include facilities that are licensed contract facilities that assist licensees who do not possess adequate storage space (Commenter No. 46).

Two other commenters (Commenter Nos. 29 and 32) stated that conditional exemptions or other relief should be granted to commercial storage facilities if they are based on a determination that such exemptions or relief provides an equivalent or enhanced level of protection to the environment, considering all aspects of the waste management cycle "from cradle to grave." These commenters believed that contractual and payment arrangements are not factors that should be included in this determination. These commenters also stated that granting exemptions or other relief to qualified commercial storage facilities is highly desirable because:
(1) commercial facilities could accept wastes for storage that they cannot currently accept due to regulatory restrictions; (2) small quantity generators that have wastes which cannot be treated, or need to be held for decay-in-storage could ship these wastes to commercial storage facilities that are specifically designed and operated for storage of mixed wastes; (3) without access to commercial facilities many generators have to develop their own dedicated on-site storage facilities, which is a highly problematic and expensive endeavor, especially for small volumes of waste; and (4) often times LLMW results from one-time or sporadic processes, and the volumes of each waste stream are very small; therefore, it may not be possible to accumulate sufficient quantities for economical treatment and disposal. These commenters concluded that extending the scope of the conditional exemption to commercial storage and treatment facilities would allow such facilities to accept these wastes which they could consolidate with other similar wastes to facilitate recycling, treatment, or disposal. These two commenters, however, also noted that it was doubtful that exemptions would be applied to RCRA TSDF's to any significant extent because there are very few, if any, RCRA treatment facilities that also have NRC licenses and associated safeguards and in most cases, they are already permitted to conduct these activities for which the exemption to the RCRA regulations would be needed. They concluded by stating that the exemption would have greater potential application to facilities that treat and dispose of LLMW and which do not have RCRA permits.

We also heard from six commenters that believed that the conditional exemption for storage should not be extended to commercial TSDFs (Commenter Nos. 38, 45, 47, 49, 60, and 61). Two of these commenters stated that TSDFs should not be considered because these facilities provide such services and are permitted to do so, and as such require no relief; therefore, it may not make sense to grant such an exemption (Commenter Nos. 45 and 61). A third commenter stated that such facilities are in the business of managing LLMW for compensation and should be

regulated accordingly (Commenter No. 60). A fourth commenter noted that although such an exemption might be beneficial to entities who generate only small amounts of LLMW (since they could ship LLMW to a TSDF instead of having to go through the expense of constructing and maintaining a storage unit) and would help reduce the numbers of small storage sites, it might cause large amounts of LLMW from numerous sources to be stored indefinitely at commercial sites that would not know who generated the materials (Commenter No. 49). A fifth commenter stated that the exemption should apply only to the generators of the waste and not to commercial TSDFs because the duration of storage at such facilities may be driven by the time requirements under the facility's RCRA permit and an exemption that would void those time frames could potentially affect the facility's ability to control waste inventory (Commenter No. 47).

Comment: We heard from one commenter regarding extending the conditional exemption to facilities that are not commercial mixed waste generators but may otherwise manage mixed waste (Commenter No. 38). The commenter stated that absent sufficient reporting requirements, such as an EPA hazardous waste manifest that would accompany the shipment, the receiving facility may not have a sufficient level of knowledge of the mixed waste constituents to allow for its safe management. The commenter believed that if EPA extended the conditional exemption to off-site TSDFs, then EPA should require that all transfer of mixed waste be accompanied by a manifest or other reporting document that would provide the receiving facility with a sufficient level of information regarding both the hazardous and radioactive waste constituents.

DOE

Comment: We heard from a total of eight commenters regarding the applicability of the conditional exemption for storage to DOE (Commenter Nos. 7, 16, 30, 36, 39, 57, 58, and 62). Five commenters supported the conditional exemption and believed that the scope of the proposed exemption should be expanded to include DOE (Commenter Nos. 7, 16, 30, 39, and 57), while three other commenters believed that the scope should not be expanded to include DOE (Commenter Nos. 36, 58, and 62). Of the five commenters that believed the scope of the conditional exemption should be expanded to include DOE, two commenters stated that any exemption(s) should not be industry specific, and if different industries generate similar waste, then the exemption should apply to all (Commenter Nos. 39 and 57). A third commenter suggested that it was unnecessary for the conditional exemption to be limited based on the nature of the mixed waste generator's business activities, or the distinction that the LLMW is stored at its site of generation (Commenter No. 16). This same commenter encouraged EPA to consider omitting from the October 1999 ANPR any language that would prohibit NRC- or Agreement State-licensed facilities from accepting DOE-generated LLMW for storage in an otherwise conditionally exempt unit. The commenter also noted that DOE may generate some qualifying LLMW which should be allowed to be stored or treated at a commercial facility meeting all the conditions for exemption established under the rule. A fourth commenter noted that DOE's authority and Nuclear Regulatory Commission's (NRC's) authority to regulate radioactive waste is derived from the Atomic Energy Act (AEA) which was originally implemented by the Atomic Energy Commission (AEC). Under which, DOE and NRC are successors to the functions

formerly vested in the AEC. NRC deals primarily with radioactive waste at non-federal facilities while DOE regulates radioactive waste at its facilities. The radiological component of mixed waste is regulated by the AEA as implemented by either DOE or NRC while the hazardous component is regulated by EPA or an authorized state under RCRA. DOE issues Orders to regulate low-level radioactive waste that are similar to NRC's regulations. This commenter therefore believed that DOE facilities are subject to the same dual regulation under RCRA and the AEA that is the subject of this ANPR and is entitled to the same relief (Commenter No. 30).

This same commenter also concurred with EPA's position that compliance with RCRA could in some instances cause noncompliance with DOE requirements and provided examples of RCRA analytical requirements, which in some instances require the facilities to open, analyze and sample mixed waste which, because of its radioactivity, could result in unnecessary personnel exposure to the radioactive component of the waste. The commenter noted that RCRA's storage time limitations presented several dual regulation compliance issues:

(1) RCRA regulations require mixed waste containers to be moved out of Satellite Accumulation Areas within 3 days of reaching the 55-gallon limit, whereas DOE Orders require mixed waste containers be surveyed for external radioactive contamination prior to being removed from Satellite Accumulation Areas to prevent the spread of radioactive contamination. This evaluation of external radioactive contamination cannot always be completed within the 3-day period because of the need to use sensitive laboratory counters under a high level of quality control. Compliance with the RCRA 3-day time period could lead to the spread of radioactive contamination if the mixed waste container has external contamination.

(2) RCRA requires that mixed waste be removed from Waste Accumulation Areas (WAAS) within ninety (90) days. If there is no disposal option, DOE is required to move the waste to a Treatment Storage and Disposal (TSDF) facility. This is problematic as activity levels in the TSDF facility, with the additional waste, could exceed nuclear facility limits for the amount of radioactivity that can be safely stored, per Technical Safety Requirements (TSRs).

The commenter noted that these above examples demonstrate how compliance with RCRA requirements (which in many cases are time driven and not specifically related to safety) could force noncompliance with DOE Orders or regulations, potentially causing increased radiation exposure to workers with no added benefit to human health and the environment (Commenter No. 30).

As noted above, we also heard from three commenters that believed that the scope of the conditional exemption should not be expanded to include DOE (Commenter Nos. 36, 58, and 62). One of these commenters stated that the conditional storage exemption should be limited to nuclear power plants until more experience with licensees is gained (Commenter No. 58). A

second commenter (Commenter No. 36) stated that it was strongly opposed to giving DOE the ability to utilize such exemptions due to many critical reasons, such as, but not limited to:

- Lack of adequate characterization and knowledge of this legacy waste
- Compliance History
- The ability to "self-regulate" under NRC delegation of AEA authority.

Lastly, a third commenter stated that, in no manner, should the conditional exemption for storage be applied to DOE and noted that States hosting DOE Sites across the Complex have been unanimous in the position that DOE has not historically, nor does it currently have in place an adequate plan to assure state oversight of radioactive waste (Commenter No. 62).

Other

Comment: Five commenters submitted remarks stating the exemption should be expanded to include other, specific industries, facilities, or groups (Commenter Nos. 18, 22, 28, 31, and 35). One commenter requested that the exemption be expanded to include fuel cycle facilities also licensed by the NRC, based upon review of supporting data for other commercial NRC licensees (Commenter No. 18). Another commenter suggested that the exemption include all DoD facilities in addition to commercial facilities, stating that the additional RCRA regulations only serve to add prescriptive requirements that escalate costs and are non-beneficial in terms of providing additional protection in terms of human health and the environment (Commenter No. 22). In a related comment, a commenter requested that the proposed scope of the exemptions be expanded to include all Army facilities as well, in addition to commercial generators (Commenter No. 28). An additional commenter stated that the exemption should include the chemical industry, due to the fact that generators currently must pursue storage extensions from state regulatory authorities to identify disposal facilities for many mixed wastes - a time consuming process (Commenter No. 35). Lastly, a commenter suggested that, in addition to facilities holding a valid NRC license or NRC Agreement State license, the exemption for storage of LLMW should include facilities with an NRC certification (Commenter No. 31).

2.1.3 Waste Types

Comment: We received seven comments questioning the waste types covered by the proposed conditional storage exemption (Commenter Nos. 16, 28, 29, 32, 48, 60, and 63). Specifically, one commenter stated that the Agency did not clearly define which types of LLMW would be eligible for the storage exemption and requested that the storage exemption apply to waste that is stored for decay as well as long-lived LLMW (Commenter No. 63). A second commenter noted that LLMW which is composed of Naturally Occurring Radioactive Materials (NORM) is not licensed by the NRC and some types of NORM are licensed by the Agreement States; therefore, some NORM LLMW will not be regulated by either Agency (Commenter No. 28). This commenter noted that the radiation hazard posed by these wastes is still an issue for worker safety and believed that the proposed rule should address whether the generators of NORM LLMW not

regulated by either NRC or an Agreement State will be required to comply with RCRA requirements. A third commenter stated that the conditional exclusion should also apply to wastes generated by maintenance or treatment (Commenter No. 60). Two other commenters noted that biomedical research and academic institutions generate organic wastes, which after "decay-in-storage" contain only tritium and carbon-14 and therefore should be considered eligible for some type of relief (Commenter Nos. 29 and 32). These commenters stated that these wastes can be placed into two groups based on their activity: (1) Low Specific Activity Tritium and C-14 wastes and (2) High Specific Activity Tritium and C-14 wastes.

These commenters also stated that biomedical research procedures generate significant volumes of mixed wastes containing very low specific activities of tritium and carbon-14 (fractions of a microcurie per gram). In these wastes, the radionuclides present a negligible radiation hazard, particularly when compared with the other hazards (ignitability, corrosivity, toxicity) posed by the hazardous organic chemical compounds present in the waste. Such wastes are most suited for treatment and disposal at RCRA permitted incineration facilities, yet they cannot be shipped there because they are still considered radioactive materials by the NRC. The commenters believed that EPA should work with the NRC to modify regulations to allow these wastes to be managed as hazardous waste. The commenters also suggested that this could be done by changing the existing NRC regulation which deregulates wastes from liquid scintillation counting that contain less than 0.05 microcuries per gram (10 CFR 20.2005) and by revising the rule to apply to all liquid mixed wastes, regardless of the generation process.

With regard to the High Specific Activity Tritium and C-14 Wastes, the commenters noted that procedures used to manufacture radiolabelled pharmaceuticals and reagents used for biomedical research purposes generate small volumes of wastes with high specific activities of tritium and carbon-14 (Curies per gram). The commenters believed that the specialized containment facilities and rigorous precautions required to prevent releases of the tritium and carbon-14 during handling and storage of these wastes exceed the safeguards imposed by EPA for management of these wastes. The commenters therefore believed that these high specific activity wastes should be exempt to facilitate storage and on-site treatment, and recycling of the tritium. (Commenter Nos. 29 and 32.)

A fourth commenter believed that this type of exemption could be applied to high-level mixed waste (Commenter No. 16). Lastly, one commenter pointed out that a wide variation in radioactive contamination levels exists in hundreds of tons of EAF dust (K061) from a source smelting incident, and therefore blending of stored material to a level approaching the average concentration should be permitted in the determination of exemption from NRC jurisdiction (Commenter No. 48). This commenter noted that because KO61 material is already under EPA jurisdiction, the new rules should provide for release from NRC jurisdiction for the extremely low levels of radiation involved, to permit this particular mixed waste to be handled in the same manner as hazardous waste.

Comment: One commenter suggested that EPA needed to clarify the exact scope of the proposed rule because they believed that the ANPR was vague in that the title stated "Storage" whereas the text of the ANPR discussed "treatment and disposal" (Commenter No. 60).

2.1.4 Regulatory Status

Comment: Several commenters suggested that the conditionally exempted wastes be exempted from all RCRA requirements while the exemption remained in effect (Commenter Nos. 18, 33, 39, 42, and 51). Two of the commenters stated that for example, as with other RCRA conditional exclusions (such as for military munitions), LLMW should not be counted for the purposes of determining a facility's RCRA generator status until the waste reenters the RCRA system (Commenter Nos. 33 and 51). The third commenter noted that the waste should become subject to regulation under RCRA only after it is no longer subject to an NRC or NRC Agreement State license (Commenter No. 39). Lastly, two commenters noted that EPA should encourage the states to adopt equivalent corresponding LLMW conditional exemptions to ensure that facilities in states with RCRA authorization for LLMW can utilize the LLMW conditional exemption (Commenter Nos. 33 and 42).

2.2 Degree to Which NRC Regulations are Sufficient for RCRA Hazards

Comment: We heard from 48 commenters regarding the issue of whether current NRC regulations are sufficient to deal with RCRA hazards at LLMW facilities (Commenter Nos. 2-4, 7, 8, 11-19, 22, 24, 27-33, 36-38, 40, 42-44, 46, 47, 49-55, 58-60, 63, 65, 66, and 69-71). Of these 48, 37 commenters believed that the NRC standards were sufficiently stringent to protect against RCRA hazards (Commenter Nos. 2, 3, 7, 8, 12-19, 22, 24, 27, 28, 30, 31, 33, 37, 40, 42-44, 46, 47, 51-55, 58, 59, 65, 66, 69, and 71). An additional six commenters offered their conditional acceptance of the NRC regulations (Commenter Nos. 11, 29, 32, 36, 49, and 50), while five other commenters believed that the NRC regulations were inadequate to protect against RCRA hazards (Commenter Nos. 4, 38, 60, 63, and 70).

As we noted above, the majority of the commenters believed that the NRC's framework for regulating LLW was sufficient for managing LLMW for many reasons. For example, several commenters stated that the nuclear power industry was one of the most stringently regulated industries and that continued regulatory compliance is ensured through implementation of the (1) NRC's strict enforcement procedures contained in NUREG-1600, (2) NRC's safety officers and on-site resident inspector program, and (3) ongoing quality assurance audits by trained auditors that are independent of the operating organization (Commenter Nos. 33, 51, and 66). Another commenter, representing a utility company, pointed out that his company had submitted to EPA detailed comments based on a side-by-side comparison of NRC and RCRA requirements suggesting that NRC radiation standards provided more than an "ample" (in many cases more protective than RCRA) margin of safety for the workers and public (Commenter No. 27). A different commenter noted that since NRC radioactive waste storage requirements are designed to minimize and discourage human access and exposure, or in other words, enhance site security,

they can offer adequate protection from RCRA hazardous constituents in mixed wastes (Commenter No. 18). Three other commenters believed that the NRC framework offered increased worker (occupational) protection than what was offered by EPA's RCRA standards (Commenter Nos. 15, 55, and 71). One of these commenters also suggested that the NRC requirements dealing with the receipt, transfer, use, and disposal of material on-site exceeded the RCRA "Cradle-to-Grave" requirements (Commenter No. 71). To support this belief, the commenter provided an extensive summary of NRC regulations to prove that NRC's regulations were more than adequate. This belief was also supported by another commenter who provided an example describing a hypothetical situation where LLMW leaked from a container (Commenter No. 9). The commenter added that because the radioactive component is to some extent inseparable from the toxic waste component, the NRC's regulations would implicitly cover the toxic component of the LLMW.

Of the six commenters who offered their conditional acceptance of the NRC regulations, two commenters stated that EPA needs to closely examine the equivalency between RCRA and NRC regulations for LLMW storage requirements before deciding to exempt LLMW facilities from the RCRA Subtitle C requirements (Commenter Nos. 11 and 36). One of these commenters suggested that EPA should consider "Address" methods to ensure that adequate license requirements will be included for RCRA exempt facilities (Commenter No. 11). This view was shared by two other commenters who also recommended a "detailed, exhaustive comparison of the two regulatory frameworks" (Commenter Nos. 29 and 32). These commenters mentioned that the NRC licensing requirements (the procedures for application for a license, review of the types of radioactive materials, equipment and facilities etc.,) and the standards for protection against radiation, are adequate for most treatment facility operations, especially for site security. However, in their view, the NRC regulations fail to address many chemical and environmental hazards that are addressed by EPA facility permit regulations. Another commenter recommended that EPA conduct cost analysis and revised capacity comparisons, in addition to document comparisons, before deciding to waive the RCRA requirements for LLMW facilities (Commenter No. 50). One commenter noted that exemption from dual regulation was warranted in instances where NRC license requirements meet or exceed the RCRA standards. This commenter argued that certain RCRA requirements, specifically those relating to: waste characterization, personnel training; ignitable, reactive or incompatible wastes; emergency response; record keeping; closure and post-closure care; financial assurance; management of waste in containers; management of waste in tanks, and containment buildings should be considered before exempting facilities from RCRA requirements (Commenter No. 49).

Of the five commenters that believe that the NRC requirements were insufficient, four commenters stated that the current NRC regulations were written to protect against radiological hazards and would not be adequately protective for the chemical hazardous component of mixed waste (Commenter Nos. 4, 38, 63, and 70). As one commenter put it, "It is not clear that 10 CFR Part 20, standards for protection against radiation, are inclusive of protection for the hazardous constituents present that would be subject to 10 CFR Part 260-299." (Commenter No. 70). Another of these commenters asserted that the NRC did not have enough experience in dealing

with issues relating to compatibility of wastes, waste storage, stability of wastes and emergency response situations. One of these commenters offered an example to buttress his point that NRC standards offer inadequate protection against chemical hazards in mixed wastes, noting that NRC's regulations would not cover the corrosive nature of nitric acid or the flammability of methyl ethyl ketone (Commenter No. 38).

2.3 Other Approaches/Options Should Be Considered

Comment: One commenter believed that a conditional or even unconditional exemption for NRC-licensed facilities is appropriate and defensible in light of the history of LLMW regulation (Commenter No. 66).

Comment: One commenter recommended that a conditional exemption be considered only as a temporary measure to enable generators to promptly reduce potential mixed waste hazards. The commenter believed that the authority for regulating mixed waste should be passed to a single regulator that has the mandate and proven experience in balancing the potentially conflicting requirements for protecting the worker and the public (Commenter No. 15).

Comment: One commenter suggested that EPA discuss the applicability of their ANPR to the three classes of LLMW under 10 CFR Part 61-Class A, B, and C (Commenter No. 60).

Comment: One commenter strongly supported the prompt establishment of criteria for exempting mixed waste forms for low-level mixed wastes containing low concentrations of RCRA hazardous constituents which may be disposed at a NRC licensed low-level radioactive waste disposal facility. This commenter recommended that EPA continue to develop "exit levels" for chemical concentrations and consider small quantity exemptions. The commenter also supported EPA's efforts for developing a proposal for disposal of mixed waste with very low concentrations of radionuclides in RCRA, Sub-Title C, hazardous waste landfills. However, for this approach to be viable and effective, the commenter noted that the concentration limits must be realistic and not unreasonably low (Commenter No. 55).

Comment: Two commenters believed that there should be greater emphasis on storage issues and facilitating treatment and noted that long-term or indefinite storage of mixed wastes increases the potential for releases, delays disposal, and is generally undesirable from the standpoints of both environmental protection and cost control. The only situation in which storage is desirable is when it reduces risks to the environment, as is the case when wastes containing short-lived radionuclides are held for decay-in-storage. Accordingly, the commenters strongly recommend that EPA and NRC consider regulatory reforms that would facilitate treatment of mixed wastes in hazardous waste incinerators or other RCRA Subtitle C facilities, that offer appropriate technologies for treatment of waste prior to disposal (Commenter Nos. 29 and 32).

Comment: One commenter suggested that EPA clearly define where any actual program duplication exists between respective regulators, and assess whether there is an environmentally

protective benefit to be obtained by the concept of exempting any LLMW from RCRA regulation. The commenter believed that any proposal to exempt LLMW from RCRA must be based on a thorough analysis of existing regulatory requirements (Commenter No. 50).

Comment: One commenter suggested that EPA explore a simplified and expedited permitting process for those wastes that are not amenable to exemption, such as LLMW containing long-lived radionuclides. This commenter noted that this may serve to ease the administrative burden associated with dual regulation on these materials (Commenter No. 44).

Comment: One commenter appreciated EPA's efforts to "reinvent" the regulations on storing LLMW, yet urged EPA to examine all the precedents being set and all the impacts resulting from the proposed changes to the existing regulations. The commenter believed that such impacts may not be limited to the management of mixed waste, but may have a wider ripple effect reaching the management of hazardous waste (non-radioactive) (Commenter No. 36).

Comment: One commenter suggested that EPA consider a conditional exemption to extend the on-site storage timeline for non-decay-in-storage mixed waste to one year. This exemption would provide small quantity generators of LLMW, in particular, the economic benefit of reducing quarterly mixed shipments waste (e.g., scintillation vials) to an annual shipment. Furthermore, if LLMW could be safely stored on-site for greater than a year in a decay-in-storage (DIS) program under NRC regulation, it would be equally safe to extend the conditional exemption to non-DIS material for storage up to one year. One way in which this could be done would be to classify generators by their LLMW generation rates. For example, a facility may be a large quantity generator for RCRA purposes but a small quantity generator for LLMW waste purposes. This classification would allow a facility to take advantage of the extended accumulation times (with appropriate storage quantities and time limitations) available for small quantity generators and conditionally exempt small quantity generators under RCRA. It would potentially allow storage beyond 90-days for LLMW under the conditional exemption, consolidating shipments and reducing LLMW disposal costs (Commenter No. 53).

Comment: One commenter supported the extension of the considered exemption to other radionuclides that may be in liquid scintillation counting fluids (LSC) in very low concentrations and are safe to manage as nonradioactive waste (Commenter No. 47).

Comment: One commenter suggested that EPA establish a conditional exemption from RCRA storage requirements if the material is managed in accordance with the appropriate state standards for NORM management. An alternate to this would be to manage the material consistent with RCRA regulations except for the 90-day storage (without a permit) limitations (Commenter No. 35).

Comment: One commenter who opposed the conditional exemption in the ANPR urged EPA to codify the military standards as EPA regulations. The commenter noted that such an approach would eliminate the inefficient reversion between two programs for periods of non-compliance

and would result in the same set of standards, not two different standards. The commenter also believed that it was inappropriate and bad public policy to use the ANPR as a precedent for the proposed rule because there was no indication in the ANPR that the NRC possesses the necessary expertise in managing chemical constituents (Commenter No. 61).

Comment: Six commenters recommended that either EPA grant full responsibility to NRC or that an MOU (or some sort of coordination) be established between EPA and NRC (Commenter Nos. 15, 29, 32, 36, 55, and 59). These commenters opposed EPA's proposal for a conditional exemption because it does not alleviate the burdens and inefficiency of the dual regulations. They also recommended that EPA transfer the entire responsibility for regulating mixed waste to NRC and Agreement States through a MOU (Commenter Nos. 15, 55, and 59). One of the commenters (Commenter No. 55) made the following recommendations for turning over the authority for regulating LLMW to NRC:

1. A Memorandum of Understanding (MOU) between the EPA and NRC must be established without any delays. This MOU should transfer the LLMW regulatory authority to the NRC from the EPA. This would result in an efficient regulatory program for occupational safety, as well as the safety of the public and the environment.

2. There have been other acts of Congress that cause overlap of federal regulatory authority for organizations licensed to possess and use radioactive materials. For example, the Occupational Safety and Health Administration (OSHA) and the Department of Transportation (DOT) are both authorized by Congress to ensure occupational safety and the safe transportation of radioactive materials, respectively, as is the NRC. However, dual regulations between the NRC and OSHA, and the NRC and DOT have been eliminated by the timely promulgation of MOU which authorizes only one agency to regulate the applicable programs.

3. The EPA and NRC should quickly resolve the issue of joint regulation of mixed waste by establishing a MOU that clearly designates regulatory authority to the NRC. This MOU would result in a preferred regulatory framework rather than EPA's conditional exemption proposal for ensuring worker safety as well as the safety of the public and the environment.

One of these commenters also stated that EPA may not have looked into studying the RCRA requirements which usually impose the heaviest burdens on the facilities that generate and manage LLMW, for the purpose of coordinating such requirements with equivalent requirements of the NRC licenses. This commenter believed that coordination between the two regulatory systems may result in a more efficient and less burdensome implementation of the requirements of both sets of regulations, without creating exemptions (Commenter No. 36). Another one of these commenters believed that conditions in the NRC or Agreement State license could be specified to ensure that the waste can only be managed by qualified staff or qualified licensed contractors

(Commenter No. 59). Lastly, two of these commenters recommended that EPA and NRC establish an ongoing effort to consolidate all waste-related regulations and enforcement programs because the current mixed-waste regulations were based on an assessment of the risks posed by the radioactive and chemical constituents separately, and urged that future LLMW regulations be based on an assessment of these constituents in combination (Commenter Nos. 29 and 32).

Comment: We heard from one commenter who stated that the technologies needed for some forms of mixed waste are not economically viable and that a significant factor in this economic impasse is the EPA permitting, timing, and location requirements. This commenter added that, if exempted from the restrictive EPA regulatory requirements, many mixed waste forms that are currently untreatable, could be treated under the NRC licensing framework (Commenter No. 55).

2.4 Inherent Risk of Hazardous *vs.* Radioactive Wastes

Comment: A total of six commenters provided comments regarding the inherent risk of hazardous *vs.* radioactive wastes (Commenter Nos. 3, 4, 15, 23, 30, and 60). Of these commenters, two believed that the current NRC regulations for protecting the public and the environment against exposure to radioactive waste are sufficient to protect the public and the environment against the hazardous constituent of LLMW (Commenter Nos. 3, and 23). One commenter believed that LLMW has a greater overall risk than hazardous wastes of the same concentrations, or radioactive waste at the same radionuclide activities (Commenter No. 60). This commenter recommended that EPA coordinate this proposed rulemaking with OSHA to assure workers are protected from the hazardous materials in LLMW (Commenter No. 60). The commenter also believed that LLMW presents a greater overall risk and suggested that EPA not deregulate LLMW without assuring that the regulations are at least as stringent for LLMW as for solely LLMW or hazardous waste. The commenter stated that EPA should not create a situation whereby it would be advantageous (based on the regulations or economics of the situation) for a generator to create a LLMW.

Lastly, two of these commenters (Commenter Nos. 4 and 15) also believed that the proposed rule should consider other health and safety risks. One of these commenters noted that the NRC's regulations already consider the following (Commenter No. 15):

1. Some byproduct materials are chemically more toxic than their radioactivity and NRC establishes limits which primarily protect against the chemical toxicity.

2. For most radiochemicals, the radioactive characteristics are recognized as the dominant hazard but NRC and licensees must be able to understand the physical and chemical properties of these materials to adequately protect against their radioactive properties.

3. The NRC and licensees have profound experience in addressing hazardous characteristics that if uncontrolled could contribute to or cause a loss in

radiological control. These considerations include flammable, irritant, corrosive and reactive properties of radioactive materials and other materials in their vicinity.

4. Another interesting feature is that the radioactive component in mixed waste can actually make it easier to control the waste because the radioactivity acts as a tracer allowing very tiny quantities of the mixed waste to be detected which could not be done if the hazardous material did not -contain radioactivity. Note that this condition always holds for radiochemicals that are both radioactive and hazardous but will also usually apply to mixtures of hazards materials with otherwise non-hazardous radioactive materials.

5. The NRC and many licensees must be able to understand the physical and chemical properties of radiochemicals to control them and model their environmental transportation and biokinetics in order to minimize and estimate radiation dose.

2.5 Licensing Process *vs.* Permitting Process

Comment: We received three comments on the licensing process *vs*. the permitting process (Commenter Nos. 15, 36, and 55). One commenter expressed the importance of involving the public in the process of regulating mixed waste (Commenter No. 36), while two other commenters supported NRC's licensing practices by emphasizing NRC's flexibility to add any condition to the license that may be necessary to promote the safe handling of mixed waste (Commenter Nos. 15 and 55). One of these commenters also noted that for most licensees their current license conditions adequately provide for the safe and effective storage and treatment of the mixed waste form in their possession, and that the NRC can require a license application or amendment to include specific conditions for any new licensees or those who may have processes that need special provisions. The commenter also noted that the NRC also has the flexibility to issue a notice to all licensees to report conditions or request a license amendment (Commenter No. 15). This commenter emphasized that it is of particular significance that most NRC licensees who generate mixed waste are licensed to handle much larger quantities of radioactive materials with other hazardous characteristics. Lastly, this same commenter also advocated for performance based regulatory requirements over traditional prescriptive requirements because each licensee has unique control issues and that prescriptive regulations cannot provide the best protection for all licensees. This commenter, however, also noted that prescriptive requirements are the best possible regulatory framework for manufacturing licensees (Commenter No. 15).

2.6 Comments on Previous Studies on Comparability of NRC Requirements

Comment: We heard from seven commenters regarding previous studies on the comparability of the NRC requirements to the RCRA regulations concerning the management of hazardous wastes. All seven commenters felt that previous documentation in this area is adequate to demonstrate that NRC requirements governing low-level waste will meet or exceed RCRA standards (Commenter Nos. 17, 27, 30, 33, 42, 47 and 51). Specifically, commenters cited studies

conducted by USWAG, the Electric Power Research Institute, the Nuclear Management and Resources Council, Inc., the Edison Electric Institute (EEI), the American Public Power Association (APPA), the National Rural Electric Cooperative Association (NRECA), and the Nuclear Energy Institute as supporting the conclusion of documentation adequacy in this area (Commenter Nos. 17, 33, 42, 47, and 51). Specific citations of these documents are provided below, if provided by the commenter:

- Rogers & Associates Engineering Corporation, Comparison of Low-Level Radioactive Waste Management Requirements with Hazardous Waste Management Requirements (Electric Power Research Institute, May 1996) (Commenter Nos. 33 and 51)

- Duke Engineering & Services, Inc. Mixed Waste Treatment Study (Electric Power Research Institute, December 1995) (Commenter Nos. 33 and 51)

- Roy F. Weston, Inc. and Duke Engineering & Services, Inc., Nuclear Utility Mixed Waste Stream Characterization Study (October 1994) (Commenter Nos. 33 and 51)
- Newman & Holtzinder, P.C., Interim On-Site Storage of Low-Level Waste, Vol. 1 (Electric Power Research Institute, May 1992) (Commenter Nos. 33 and 51)

- Envirosphere Company, Comparative Assessment of the Environmental Protection Agency's Regulations for Hazardous Waste Tank Systems and Comparable Nuclear Regulatory Commission Requirements (1988) (Commenter Nos. 33 and 51)

- Letter from Arizona Public Service to Environmental Protection Agency Comparing Applicable NRC Requirements for LLMW and Corresponding RCRA Management Standards (December 2, 1997) (Commenter No. 33)

- Electric Power Research Institute, Mixed Waste Management Guidelines (December 1993) (Commenter No. 33).

Comment: One commenter cited a second generation HWIR rule proposed in late 1995 (60 FR 66344; December 21, 1995) that suggested implementation of measures to provide relief from the duel NRC and RCRA regulations. The commenter felt the rule was too limited as it focused only on DOE facilities (Commenter No. 27). A different commenter pointed to a study conducted by the LLNL and LBNL in conjunction with DOE that in part compared DOE's requirements for management of the radioactive portion of combined waste with California's RCRA regulations for the management of the hazardous portion of combined waste. Similar in conclusion to other studies cited here, the study confirmed that DOE requirements meet or exceed California's RCRA requirements in almost all instances (Commenter No. 30)

2.7 Compliance History

2.7.1 Nuclear Power Plants

Comment: We heard from nine commenters who believed that a substantial base of information exists to demonstrate the excellent safety record of nuclear power plant management (Commenter Nos. 19, 27, 33, 37, 40, 42, 51, 54, and 58). Two commenters pointed to a "deeply rooted compliance culture" that is the result of enforcement policies under NRC oversight. This statement was supported by a citation of the NUS Information Services TRENDS " Utility Inspection Database," submitted to EPA by USWAG, which identifies only a small number of violations since 1985 (Commenter Nos. 33 and 51). Two other commenters felt that EPA has a sufficient technical record for issuing a conditional exemption for commercial LLMW generated by nuclear power plants regulated by the NRC (Commenter Nos. 37 and 54). Finally, one commenter stated that the NRC program has shown to be adequately protective (Commenter No. 27).

2.7.2 Material Licensees

Comment: We heard from fourteen commenters regarding the compliance history of material licensees (Commenter Nos. 2, 3, 7, 12, 13, 15, 18, 23, 25, 29, 32, 38, 53, and 55). Eleven of the commenters either cited their own lack of any incidents of mixed waste mismanagement, or stated that compliance in the area of mixed waste management among NRC licensees has been generally very good (Commenter Nos. 2, 3, 7, 12, 13, 15, 18, 23, 38, 53, and 55). Some commenters attributed the low number of incidences to an aggressive enforcement policy on the part of state regulators, or to the effective focus of NRC waste management policy (Commenter Nos. 7 and 18). One commenter pointed to the positive management record of LLW as evidence that LLMW could be managed in a similarly safe manner (Commenter No. 25). Two commenters requested that EPA include research facilities, universities, and medical facilities, in addition to nuclear power facilities, in the exemption involving management and on-site treatment of radioactive wastes (Commenter Nos. 29 and 32).

2.7.3 DOE

Comment: We heard from three commenters that believed that DOE did not have a very good compliance record. Specifically, one commenter noted that the impetus for regulating LLMW came from the contamination problems that had been created at self-regulated DOE facilities, rather than from NRC-licensed facilities (Commenter No. 66). A second commenter stated that it was strongly opposed to giving DOE the ability to utilize such exemptions due to many critical reasons, such as, but not limited to (1) Compliance History and (2) the ability to "self-regulate" under NRC delegation of AEA authority (Commenter No. 36). Lastly, a third commenter stated that, in no manner, should the conditional exemption for storage be applied to DOE and noted that States hosting DOE Sites across the Complex have been unanimous in the position that DOE has not historically, nor does it currently have in place an adequate plan to assure state oversight of radioactive waste (Commenter No. 62).

2.8 Other

Comment: We heard from numerous commenters that supported the establishment of a regulatory exemption from RCRA hazardous waste disposal requirements for radioactive waste containing low concentrations or low quantities of RCRA hazardous constituents (Commenter Nos. 15-17, 20, 25, 27, 29, 33, 43, 55, 65, and 66). These comments were often associated with the suggestion that EPA develop "reasonable" concentration limits that are not unrealistically low, below which the waste would no longer be regulated as hazardous (Commenter Nos. 15, 43, 48, and 55). Several commenters suggested that the EPA should work with the NRC or allow the NRC to establish specific disposal criteria for exempting additional mixed waste forms in specific disposal sites (Commenter Nos. 15, 20, 25, and 55). One of these commenters noted that the RCRA regulations must allow for the disposal of LLMW at a licensed NRC facility when the LLMW, especially when the radiological constituents pose a greater environmental risk than the RCRA hazardous constituents (Commenter No. 20). Two of these commenters (Commenter Nos. 15 and 55) also supported EPA's effort to continue to develop exit levels, though one commenter (Commenter No. 15) suggested that EPA should consider other sets of exit levels that would apply to particular common disposal practices. Lastly, one of these commenters noted that LLMW should be allowed to be disposed of without regard to its radioactive isotope (Commenter No. 25). Specifically, the commenter stated that the notion of "once radioactive, always radioactive" has led to confusion resulting from duel regulation. The ultimate effect of this situation, the commenter suggested, has been for RCRA-permitted facilities to reject acceptance of materials that were once radioactive, but have decayed to background levels, based on the notion that the facilities are not permitted to accept mixed wastes.

Comment: We heard from one commenter suggesting that EPA could reduce the burden on generators by allowing any LLMW to be exempted from RCRA during transport from one location to another if both are operated under the same NRC or Agreement State license (Commenter No. 29). The commenter went on to suggest that this would expedite the transport of LLMW to state licensed management firms, allowing wastes to be consolidated and managed jointly (Commenter No. 29). In a related comment, a second commenter stated that transportation should always be regulated (Commenter No. 60).

Comment: We received two comments related to concerns regarding exemptions and their effects on incentives for generators (Commenter Nos. 11 and 36). One commenter pointed out that allowing exemptions for generators of hazardous and mixed waste would lessen the incentive for those generators to minimize the amount of mixing of hazardous wastes with radioactive wastes in their processes (Commenter No. 36). The other commenter stated that they support inclusion of incentives for P2 and waste minimization for exempted mixed waste (Commenter No. 11).

Comment: Two commenters stated that EPA's current policy of establishing a "lower priority of enforcement of the storage prohibition" was an inadequate solution to the issue of LLMW storage (Commenter Nos. 15 and 43). Both commenters pointed out that this policy forces the licensee to exist in noncompliance with the hope of not being cited for a violation. One of these

commenters also noted that the policy is vague, subject to variable interpretations, and presented an unacceptable level of regulatory uncertainty (Commenter No. 43).

Comment: We heard from one commenter that noted that any NRC or Agreement State licensee who possesses LLMW must have the necessary staff expertise to address the hazardous components of their LLMW, as well as the appropriate groundwater, surface water, and air monitoring programs to assure the hazardous constituents can be detected at their sites (Commenter No. 60). This commenter also noted that it was unclear how NRC or Agreement States would assure that a licensee's own laboratory or contractor laboratory would have the proper laboratory protocols to analyze for hazardous constituents, unless EPA expects these radiation programs to be the equivalent of a fully authorized, RCRA--delegated state program. The commenter questioned whether EPA was planning to delegate RCRA authorization to NRC or Agreement State radiation programs, separate from their already delegated RCRA programs.

Comment: We heard from one commenter stating that while they were encouraged by the ANPR, they felt they had little likelihood of benefitting from the proposed exemption (Commenter No. 68). Specifically, the commenter noted that it had been over seven years since EEI/USWAG filed a petition for limited exemptions and EPA has been assessing the dual regulation issue for over ten years, during which time the regulation of mixed waste has become institutionalized at the state level (Washington funds its LLMW regulatory infrastructure through a dedicated mixed waste generator fee program). The commenter then stated that if EPA eventually provides an exemption, it does not necessarily mean that all regulated entities will be able to take advantage of the change.

Comment: One commenter requested that EPA clarify a reference on page 10066 of the FR notice, which reads, “For further information on applicable NRC regulations, refer to 10 CFR Part 20 Subpart I” (Commenter No. 60). The commenter stated that it is unclear if the EPA intended to reference this subpart in their ANPR.

3. APPROACH FOR SIMPLIFYING DUAL REGULATION: CONDITIONAL EXEMPTION FOR DECAY-IN-STORAGE

3.1 Scope of Exemption

Comment: We heard from a total of 31 commenters that supported the proposed conditional exemption for Decay-in-Storage (DIS) (Commenter Nos. 11, 13-17, 19, 23, 26, 27, 29, 32, 33, 37, 39, 40, 43-47, 49, 51-53, 60-62, 65, 66, 68, 69, and 71). Nine of these commenters either stated that EPA should allow facilities to store the LLMW to the level of decay set by the NRC or that facilities should be able to use the DIS option as long as they are following the requirements of their NRC licenses (Commenter Nos. 13-15, 39, 43, 44, 53, 61, and 69). Three of the commenters stated that allowing for DIS will minimize the potential hazards to the public associated with management of LLMW; specifically risks associated with transportation would be minimized and workers health would be protected (Commenter Nos. 15, 16, and 32). One of

these commenters added that they would support the proposed DIS option as long as "EPA structures and exemption for DIS so that the chance of a LLMW releases is not increased" (Commenter No. 16). Another commenter noted that allowing DIS would ease concerns for many facilities in finding a waste management facility that handled both radioactive and hazardous waste (Commenter No. 32). A different commenter added that the exemption also should be applied to companies that store LLMW for companies that don't have storage capacity (Commenter No. 46). In addition, although five commenters supported the DIS proposal, they stated that the DIS option would not be that useful for nuclear power plants/electric utilities since most of the wastes managed at these facilities have longer half lives than those prescribed by the NRC (Commenter Nos. 17, 33, 40, 51, and 68). Yet a different commenter stated that the DIS strategy will save non-nuclear power plant facilities much money since they will be allowed to use DIS to lower radioactivity levels in LLMW that otherwise would have to be sent to very expensive LLMW commercial treatment facilities for disposal; instead the waste could be sent to a RCRA authorized facility (Commenter No. 53). Lastly, six commenters stated that though they generally supported the DIS proposal, the DIS strategy should have no bearing on whether the broader conditional exemption for nuclear power plants is approved (Commenter Nos. 17, 27, 33, 37, 51, and 65).

We also heard from two commenters that opposed the DIS approach laid out in the proposal (Commenter Nos. 52 and 71). Both of these commenters, stated that they preferred a strategy similar to the military munitions rule because it would provide them with more flexibility to manage wastes that: (1) have longer half-lives than those prescribed by the NRC; (2) are difficult to dispose of; (3) do not meet NRC's criteria of "cannot be distinguished from background" after 10 half lives; and (4) began their decay at different times (Commenter Nos. 52 and 71). One of these commenters added that the proposed DIS language should not include the term "on-site" since many universities have extended campuses with unattached buildings and that the DIS proposal allow for storage in centralized waste storage sites (Commenter No. 52). The other commenter noted that the DIS exemption still does not address the longer half-life LLMW (Commenter No. 71).

3.2 Length in Storage

Comment: We heard from a total of 18 commenters regarding the length of time to allow for DIS (Commenter Nos. 2, 7, 9-12, 14, 25, 26, 29, 32, 34, 44, 46, 47, 57, 60, and 63). Eight of these commenters recommended that we tie storage length to the half-life limitations on their material licenses (Commenter Nos. 7, 25, 29, 32, 34, 44, 57, and 60). Three other commenters stated that a 120 day half-life limitation, up to 10 half-lives, would be sufficient for them, and one of these commenters added that EPA should agree on storage time with the NRC first (Commenter Nos. 2, 9, and 12). Four other commenters suggested other half-life limitations: 300 days; 65 days; 270 days; and 90 days (Commenter Nos. 26, 46, 47, and 63). Another two commenters suggested that storage time be much longer in order to apply it to nuclides commonly used in research (H-3 and C-14 with half lives in years) (Commenter Nos. 10 and 47). A different commenter urged EPA to adopt no storage time limitations (Commenter No. 44).

Of the eight commenters that agreed with the idea of tying storage length to the limitations on the material license, two commenters stated that doing so would simplify operations and waste management operations (Commenter Nos. 25 and 29). One of these commenters argued that allowing Agreement States to determine storage time (for DIS and storage) increases overall safety since they are capable of determining if particular faculties have the capabilities of storing wastes for long or short periods of time (Commenter No. 7). Two of these commenters stated that NRC is considering extending its default DIS half-life from 65 to 120 days and they added that by connecting storage time to license limitations (assuming NRC adopts 120 days), EPA's regulatory burden would be lessened since all <120 day half-life waste would be automatically exempted (Commenter Nos. 29 and 32).

3.3 Timing of Exit from RCRA System

Comment: A total of six commenters provided comments regarding the issue of when a LLMW exits RCRA authority (Commenter Nos. 10, 23, 34, 38, 39, and 44). All six of these commenters stated that LLMW should not be regulated under the RCRA system while it is decaying and is under the purview of the NRC. One of these six commenters, added that doing so would eliminate the problems associated with obtaining RCRA interim status due to the inability of finding suitable treatment and storage facilities (Commenter No. 39).

3.4 Timing of Reentry into RCRA System

Comment: We heard from a total of 25 commenters regarding the issue of when waste would reenter the RCRA system (Commenter Nos. 3, 7-10, 12, 14, 15, 23, 25, 29, 33, 34, 38, 43, 44, 46, 49, 51-53, 57, 60, 69, and 70). Nineteen of these commenters supported the strategy to bring waste back into the RCRA system once the LLMW has either "decayed" or " decayed to background levels" or "decayed to insignificant levels" (Commenter Nos. 3, 7, 8-10, 12, 14, 15, 23, 25, 33, 38, 44, 51-53, 57, and 70). Two of these commenters stated that facilities should be given some flexibility in determining when waste had actually "decayed" since there are other factors, such as varying decay time for complex mixtures of isotopes and having sufficient time to arrange transport, that complicates matters for facilities (Commenter Nos. 33 and 51). These commenters recommended that facilities be given one year to convert decayed LLMW into RCRA waste. One other commenter strongly urged EPA to insert language in the rule (if passed), that LLMW must decay to NRC or Agreement State specified levels for a minimum of 10 half-lives and that "survey results equal background levels" when determining when a waste enters the RCRA scheme (Commenter No. 46).

In addition, one commenter stated that to assure decayed is waste is treated or disposed within the time frames required by RCRA, a facility should characterize their waste, determine an exit date based on knowledge of decay rates for the isotopes, mark containers when decay is complete, and begin RCRA accumulation countdown after exit date (Commenter No. 25). Another commenter stated that waste could enter the RCRA system only after it has decayed and has been removed from the DIS inventory (Commenter No. 38). Furthermore, one commenter

provided a similar recommendation but added that waste should first be surveyed and a formal documented release should be the trigger for entry into the RCRA system (Commenter No. 53). Lastly, one commenter noted that EPA should publish a position paper to aid in interpreting the proposed regulations for determining when a waste enters RCRA (Commenter No. 15).

Two of these commenters also noted that often non-detectable background levels are not specifically established by the NRC and vary from state to state so background at one facility may be different that background at another facility (Commenter Nos. 10 and 51). Specifically, one of these commenters stated that since AEA low-level waste requirements protected the waste after it had decayed, as well during the decay process, there should be no urgency to convert the waste to RCRA management (Commenter No. 51) . The other commenter echoed the same concern that often "indistinguishable from background" is not the same as "no radioactive material in waste" which is a requirement prior to acceptance at many commercial waste treatment facilities (Commenter No. 10). This commenter added, that therefore EPA should make sure that once the waste decays to NRC license levels (indistinguishable from background) it will have to be accepted for treatment by commercial treatment facilities, even if the radiation survey finds extremely small (10E-6) concentrations of radioactive material in the waste (Commenter No. 10). A third commenter noted that after 10 half-lives, containers of radioactive waste do not always meet the additional release criteria described in NRC Regulatory Guide 10.8, which requires containers to be held until they "cannot be distinguished from background" using the appropriate radiation detection instrument; therefore, the waste would again be regulated by both EPA and NRC (Commenter No. 52)

The remaining six commenters offered slightly different suggestions as to when waste should enter the RCRA system (Commenter Nos. 29, 33, 43, 49, 60, and 69). One of these commenters stated that waste could enter the system once it was no longer regulated by the NRC or Agreement State (Commenter No. 49). Another commenter suggested that reentry occur once the waste was declared "non-radioactive" by the generator, thereby giving the generator enough time to arrange for treatment, disposal, and characterization (Commenter No. 29). Another commenter suggested that reentry occur after the licensee documents the end of the decay period and the licensee has determined that there is "no residual radioactivity" (Commenter No. 33). Two other commenters recommend that the start of the RCRA time lines could commence "once the waste was verified to meet the DIS requirements" or the waste had decayed to levels where the waste could be regulated by RCRA alone (Commenter Nos. 60 and 69). A final commenter simply suggested that EPA should clearly define the period when the "clock starts" (Commenter No. 43).

3.5 Other Issues/Factors to be Considered

Comment: We heard from one commenter that stated if certain prescribed conditions for storage and treatment of LLMW are not met prior to entry into the RCRA system, the handler could instantly be out compliance with RCRA once reentry occurs (Commenter No. 70). This same commenter added that there are other regulatory considerations, such as SARA III and EPCRA,

that are associated with the generation of hazardous waste that are not paralleled in the NRC regulatory scheme.

Comment: We heard from one commenter supporting EPA's assertion that low levels of radioactive materials may safely accompany toxic waste to a RCRA site, since most RCRA sites are essentially LLMW sites with added protective measures (Commenter No. 9).

Comment: We heard from a commenter that stated even if DIS authority is granted to qualifying facilities, the material should still be inspected and characterized periodically to identify the hazardous constituents (Commenter No. 49).

Comment: We heard from one commenter, who in general supported the DIS proposal, but stated that DIS may conflict with restrictions on storage of untreated wastes that are subject to LDRs (Commenter No. 29). The commenter added that to remedy the potential conflict DIS could be prescribed as BDAT for treatment of short lived LLMW or short lived mixed wastes could be exempted from LDR regulations.

Comment: We heard from two commenters that suggest an approach to help EPA develop ideas regarding assurance of treatment or disposal within RCRA time frames (Commenter Nos. 29 and 32). Specifically, these commenters suggested that EPA could either review documentation already required by the NRC (e.g., DIS and waste transfer transactions recorded as requirement of license), or impose additional container labeling and record keeping requirements under RCRA.

Comment: We heard from one commenter suggesting that to assure compliance with RCRA following the end of the DIS period, facilities could easily alter their monitoring activities to include proper labeling, storage and disposal activities as RCRA necessitates (Commenter No. 63).

3.6 Other Approaches

Comment: Four commenters provided comments regarding other possible approaches for implementing the proposed conditional exemption rule (Commenter Nos. 10, 15, 52, and 54). One commenter stated that because the proposed conditional exemption would require a facility to meet certain conditions described in the rule, the proposed rule should be considered a performance standard (Commenter No. 52). This commenter added that performance standards are generally more efficient. Another commenter recommended that EPA adopt the NRC exit levels, described in 10 CFR 20.2005, for H-3 and C-14 without the requirement that the medium be used for liquid scintillation counting (Commenter No. 10). The commenter added that adopting NRC's exit levels would provide greater opportunities for generators to dispose/treat of LLMW and would protect the health and safety of the general public without unnecessary social costs. One commenter recommended that since NRC already adequately regulates LLMW, EPA should transfer all authority for managing LLMW to the NRC while it is still radioactive (Commenter No. 15). The commenter added that once the radioactivity decreased to insignificant

levels, management authority would be transferred back to the EPA. Finally, one commenter suggested that conditional decay-in-storage exclusion should operate independently from the general management conditional exclusion and be flexibly applied (Commenter No. 54).

4. APPROACH FOR SIMPLIFYING DUAL REGULATION: CONDITIONAL EXEMPTION FOR TREATMENT OF WASTE IN STORAGE

4.1 Scope of Exemption

Comment: We heard from a total of 38 commenters regarding the scope of the exemption (Commenter Nos. 3, 4, 7, 9, 12, 13, 15, 16, 19, 20, 22, 23, 26, 29, 30, 32, 33, 37, 38, 39, 40, 42-46, 49, 51, 52, 57, 60-63, 65, 66, 68, and 71). All but three of the commenters supported the concept of an exemption to allow generators to treat their LLMW (Commenter Nos. 4, 60, and 61).

Of the 35 commenters that supported the exemption, two noted that the on-site treatment exemption should be pursued, but that it should not cause EPA to delay rulemaking on the conditional exemption for storage (Commenter Nos. 33 and 68). Another commenter noted the lack of management options for mixed waste, other than indefinite storage, and claimed that on-site treatment would be economical and would promote good safety practices (Commenter No. 32), while three other commenters noted that the ability to treat wastes onsite can also decrease costs and potential liabilities associated with off-site management (Commenter Nos. 29, 32, and 44). One commenter noted that the conditional exemption would reduce the amount of mixed waste that would need to be disposed of (Commenter No. 52). Two other commenters believed that the treatment of LLMW should be permitted because it reduces volume as well as detoxifying most of the toxic material contained in the LLMW (Commenter Nos. 9 and 66). Five commenters noted the exemption would help provide a reduction in cost and administration (Commenter Nos. 12, 40, 42, 52, and 63).

In addition, two commenters felt that the technologies available to render mixed waste less harmful are often not economically feasible for the amount of waste a given generator produces (Commenter Nos. 15 and 66). These commenters generally felt that the capacity and cost limitations of expensive treatment methods and technologies are not justified by the actual health and environmental risks imposed by the non-radiological constituents in the mixed wastes. One of these commenters further pointed out the cost limitations tend to increase the amount of time the mixed wastes are stored, increasing risk of human contact and environmental release (Commenter No. 66). The same commenter pointed out that this is contrary to the nuclear industry's efforts to maintain worker exposures and environmental impacts "as low as reasonably achievable" (ALARA).

4.1.1 Facility Locations

Comment: We heard from eight commenters specifically regarding whether the conditional treatment exemption should be limited to on-site facilities (Commenter Nos.16, 22, 29, 32, 39, 44, 52, and 66). One commenter requested relief from RCRA requirements for treatment performed in containers onsite (Commenter No. 22). Another commenter indicated the definition of "site" should follow the NRC convention in which non-contiguous areas on the same license should be considered a single "site" to permit LLMW to be transported from one location to another, provided both locations are included in the same NRC or Agreement State radioactive materials license (Commenter No. 44). Four other commenters noted that conditional storage or treatment should be allowed under the control of a licensee, regardless of whether the activity occurs on-site or off-site (Commenter Nos. 16, 39, 52, and 66). One of these commenters noted that limiting the proposal to on-site facilities would restrict universities and similarly configured facilities having "off-site" consolidation facilities (Commenter No. 52). Lastly, two commenters supported EPA in allowing generators to treat wastes without permits if the waste is held in containers or tanks at satellite accumulation areas, or at waste collection areas, provided that such treatment is completed within the holding times allowed by RCRA (Commenter Nos. 29 and 32).

4.1.2 Facility Types

Nuclear Power Facilities

Comment: We heard from 25 commenters regarding the type of facilities that should be allowed to take advantage of the proposed exemption (Commenter Nos. 2, 3, 9, 13, 15, 16, 20, 23, 26, 27, 29, 32-34, 37-39, 44, 46, 51, 57, 58, 62, 65, and 66). Four commenters supported on-site treatment of waste by nuclear power plants (Commenter Nos. 20, 27, 51, and 58). One of these commenters stated that ten 55-gallon drums of their legacy inventory of liquid waste could be processed in-house under the requirements of their NRC license and would introduce no new RCRA hazards into the process stream (Commenter No. 20). One of the commenters asserted that treatment is regulated by the NRC as strictly as storage and other on-site management of LLMW (Commenter No. 27). A third commenter indicated that the safety evaluation process specified in 10 CFR 50.59, along with other EPA requirements, would assure that onsite treatment by nuclear power plants is performed safely (Commenter No. 58). The fourth commenter further encouraged EPA to provide a streamlined conditional exclusion for all LLMW management regulated under a valid NRC license, including on-site LLMW treatment in order to allow electric utilities to process wastes for safer storage and disposal (Commenter No. 51).

Material Licensees

Comment: We heard from 21 commenters that believed the scope of the treatment exemption should be expanded beyond nuclear power plants to include other nuclear facilities (Commenter Nos. 2, 3, 9, 13, 15, 16, 20, 26, 29, 32-34, 37-39, 44, 46, 51, 57, 65, and 66). One commenter noted that it currently has ten small containers of NORM material onsite, and that it must decide whether to be permitted as a TSDF, because they have to store the material more than 90 days or attempt to solidify the material onsite using Portland cement in order to treat the NORM as

radioactive waste (Commenter No. 26). This commenter believed that generators should be allowed to treat LLMW on a small scale without a permit, or alternately as a minimal notification procedure. Two other commenters stated that biomedical institutions generally have a little if any toxic material other than organic compounds such as solvents which can easily be treated (Commenter Nos. 9 and 66). Another commenter felt that generators would be responsible for ensuring that the treatment will not result in an unacceptable release into the environment (Commenter No. 38). Another commenter noted that as long as LLMW facilities are subject to applicable provisions in their NRC or Agreement State licenses and all other specified conditions of exemption are met, the LLMW should be eligible for the conditional exemption, regardless of what type of facility generated (including Federal Facilities and DOE facilities) the waste (Commenter No. 16).

One of these commenters also noted that for most licensees their current license conditions adequately provide for the safe and effective storage and treatment of the mixed waste form in their possession. Any new licensees or those who may have processes that need special provisions, the NRC can require a license application or amendment to include specific conditions. NRC also has the flexibility to issue a notice to all licensees to report conditions or request a license amendment (Commenter No. 15). This commenter also emphasized that it is of particular significance that most NRC licensees who generate mixed waste are licensed to handle much larger quantities of radioactive materials with other hazardous characteristics. Because NRC regulations require the minimization of waste to minimize exposure, the mixed waste generated is typically a tiny fraction of the radionuclides and hazardous chemicals used in routine manufacturing and R&D practices. Consequently, these licensees are already qualified to process radiochemicals in any form and therefore should be allowed to treat mixed waste without concern that they might not have the capability to protect the environment. Furthermore, in the event that a licensee wants to use a process for treating mixed waste which they lack experience in, the NRC can exclude this activity as a license condition, or require that the licensee determines and includes all the requirements for safety conducting the process or require that the licensee contract another qualified licensee to treat the waste (Commenter No. 15). Lastly, one commenter supported the exemption but hesitated to expand this exemption to other facilities because of a lack of familiarity with the technical record or compliance history of those facilities (Commenter No. 51) and one commenter specifically stated that the exemption should not apply to DOE (Commenter No. 62).

Commercial Treatment, Storage, and Disposal Facilities

Comment: We also heard from two commenters that specifically stated that the proposed exemption should also be extended to commercial TSDFs (Commenter Nos. 23 and 26). One of these commenters noted that allowing TSDFs to treat NRC deregulated wastes without major permit modifications would create more vendors who are properly licensed to manage these wastes (Commenter No. 26). This commenter also stated that academic and medical institutions would directly benefit from inclusion of commercial TSDFs.

4.1.3 Types of Units

Comment: We heard from 14 commenters regarding the types of units (and unit processes) that should be eligible for the conditional treatment exemption (Commenter Nos. 2, 4, 7, 9, 13, 22, 30, 32, 34, 44, 52, 57, 60 and 61). One commenter supported the exemption specifically where the treatment of mixed waste is performed on-site and is treated in a tank, container, or containment building in accordance with the generator's NRC license requirements (Commenter No. 7). The commenter further stated their support for a treatment exemption for treatment processes that are performed in enclosed units with filtered exhaust systems. Another commenter requested relief from RCRA requirements for treatment performed in on-site containers (Commenter No. 22). A third commenter noted that the definition of "tank or container" should include, but not be limited to, small-volume containers such as carboys, liquid scintillation vials, and other commonly-used containers (Commenter No. 44). Two other commenters suggested that EPA expand the exemption so as not to limit the exemption to treatment in containers, tanks, or containment buildings (Commenter Nos. 30 and 32). These two commenters noted that there are several types of treatment in miscellaneous units (e.g., solidification, cold evaporation, centrifugation) that should also be included. Three other commenters, however, opposed the treatment exemption (Commenter Nos. 4, 60, and 61). Specifically, one commenter opposed the on-site treatment of mixed waste, unless it can be performed in the generator's accumulation tank or container in conformance with the requirements of Part 262.34 and Subparts J and I of Part 265 (Commenter No. 61). The other two commenters stated that treatment, other than decay-in-storage should be fully regulated unless it qualifies for one of the standard RCRA permit exemptions (Commenter Nos. 4 and 60). These commenters also believed the conditional exemption for treatment was inappropriate, as the proposal failed to address numerous health and safety issues.

We also heard from seven commenters regarding specific treatment options (Commenter Nos. 2, 9, 13, 34, 44, 52, and 57). Three commenters stated that various technologies are available to treat mixed waste, including separating hazardous constituents and the radioactive portion from LLMW waste, physical or chemical separation techniques as well as stabilization/solidification, and neutralization of acids or bases (Commenter Nos. 2, 34, and 57). Two commenters also noted that simple treatments, such as neutralization of acids and bases, ion exchange, small scale distillation, and similar measures performed by qualified and authorized personnel should be permitted without restriction (Commenter Nos. 44 and 57). Another commenter suggested that thermal treatment of liquid scintillation counting fluids (which account for the bulk of LLMW stored) was a safe and effective treatment method, which meets all air quality, RCRA, and radiation protection standards (Commenter No. 13). Two other commenters advocated incineration (Commenter Nos. 9 and 52). Specifically, one commenter suggested that EPA should allow incineration of any material that contains C-14 and tritium below limits now set for liquid scintillation fluid as non-radioactive (Commenter No. 52). The other commenter noted that most waste that is generated by biomedical institutions can simply be incinerated (Commenter No. 9).

4.1.4 Wastes Types

Comment: We heard from six commenters that made specific comments regarding the types of wastes that should be allowed to be treated under the proposed exemption (Commenter Nos. 13, 16, 29, 32, and 45). Two commenters recommended that EPA allow the exemption to apply to all liquid mixed wastes, regardless of the generation process (Commenter Nos. 29 and 32). Another commenter suggested that EPA should expand the exemption to include LSC fluids containing other radionuclides present in very low concentrations, where workers, the public, and the environment can be assured by licensees (Commenter No. 13). One commenter suggested that EPA review the dual regulatory scheme encountered at LLMW treatment facilities since some wastes generated during "maintenance operations" or which are "part of residues from treatment" may be conditionally exempt, but the LLMW regularly handled would not be (Commenter No. 45). Lastly, one commenter stated that the scope of the exemption should include any qualifying LLMW (Commenter No. 16).

4.1.5 Other

Comment: Two commenters noted that EPA should work with the NRC to modify the regulations to allow liquid wastes to be managed as hazardous waste (Commenter Nos. 29 and 32). Two commenters also suggested that EPA work with NRC to remove regulatory obstacles to treatment of mixed wastes containing very low levels of radioactivity in hazardous waste incinerators and other treatment facilities (Commenter Nos. 15 and 66).

Comment: Another commenter urged EPA to review dual regulations of a fully permitted mixed waste facility to reduce unnecessary dual regulations (Commenter No. 45). This commenter also noted that providing an exemption from certain regulations for certain types of wastes being managed with fully regulated waste may not make sense and that the types of treatment technologies should be specifically itemized in the NRC license.

Comment: Three commenters noted that EPA should ensure that the storage and treatment conditional exemption entirely excludes LLMW from all RCRA requirements while the exemption remains in effect (Commenter Nos. 33, 39, and 51). One of these commenter also noted that waste should be subject to regulation under RCRA only after it is no longer subject to an NRC or NRC Agreement State license (Commenter No. 39).

4.2 Degree to Which NRC Regulations are Sufficient for RCRA Hazards

Comment: Thirteen commenters provided comment regarding the degree to which NRC regulations are sufficient for RCRA treatment standards (Commenter Nos. 3, 7, 8, 15, 25, 36, 40, 42, 51, 53, 60, 63, and 71). Ten commenters believed that NRC regulations and licensing requirements are sufficient to protect employees, the public and the environment (Commenter Nos. 3, 7, 8, 15, 40, 42, 51, 53, 63, and 71). One commenter asserted that NRC regulations do not account for the chemical nature of the wastes with regard to treatment (Commenter No. 25) and another commenter was concerned that NRC regulations do not list any hazardous constituents treatment standards (Commenter No. 36). A different commenter felt that active

treatment, transportation, and disposal tend to increase the risks of mismanagement or exposure and that NRC regulations are not an effective substitute for RCRA Subtitle C requirements (Commenter No. 60). Two commenters noted that the NRC requirements for processing LLMW are basically the same as those for treating hazardous waste under RCRA (Commenter Nos. 7 and 51). One commenter used 10 CFR Parts 19, 20, 30, 33 and 35 to demonstrate that NRC requirements often meet or exceed RCRA requirements in areas such as worker rights and responsibilities, licensing requirements, and generation of LLMW through medical uses (Commenter No. 71). Another commenter also detailed the reasons why treatment under an NRC license should provide an acceptable level of safety (Commenter No. 15). The commenter's reasons included:

(1) the strict limits for radionuclides for releases of mixed waste in effluent;

(2) most licensees who generate mixed waste demonstrate a capability to treat mixed waste using technologies they already effectively use for other types of waste;

(3) NRC has the flexibility to exclude the use of a treatment process, to issue a notice to all licensees to report conditions or to request a license amendment; and

(4) NRC licensees must demonstrate their capabilities prior to obtaining a license.

Lastly, one commenter stated that the conditional exemption requirements would provide protection against the radioactive and chemical hazards associated with LLMW when handled under the NRC framework (Commenter No. 53). This commenter also noted that NRC has specific requirements under 10 CFR 20.1101(d) for air emissions of radioactive materials in the environment.

4.3 Other Approaches

Comment: We heard from one commenter that suggested that EPA utilize NRC waste disposal and effluent controls for radioactive materials present in small concentrations (Commenter No. 44). This commenter stated that hazardous wastes should not be considered LLMW by the EPA when containing radioactive materials that are allowed to be disposed of as if it were not radioactive (10 CFR 20.2005) and that do not result in public doses greater than 50 mrem/year (10 CFR 20 Appendix B Table 2). This commenter also suggested that materials specifically exempted from NRC regulation under 10 CFR 40.13 that are mixed with hazardous waste be exempted from classification as LLMW.

5. POSSIBLE CONDITIONS THAT MUST BE MET TO QUALIFY FOR EXEMPTION

5.1 Possession of Valid License

Comment: We heard from a total of 16 commenters regarding the proposal to regulate the conditional exemption for LLMW commercial facilities under a valid NRC license or NRC Agreement State license (Commenter Nos. 16, 17, 24, 27, 29, 32, 33, 37, 40, 42, 44, 46, 51, 54, 65, and 67). Of the 16 commenters, 12 endorsed the proposal requiring possession of a valid NRC license or NRC Agreement State license (Commenter Nos. 17, 24, 27, 33, 37, 40, 42, 46, 51, 54, 65, and 67) and four opposed the proposal (Commenter Nos. 16, 29, 32, and 44).

Two of the twelve commenters who endorsed the proposal, specifically noted their approval of the provision to issue a conditional exemption for LLMW facilities that are regulated under a valid NRC license (Commenter Nos. 37 and 46). The other ten commenters contended that in addition to the NRC license provision, the other appropriate requirement for a general conditional exemption was an initial notification to the Agency by facilities when claiming the conditional exemption (Commenter Nos. 17, 24, 27, 33, 40, 42, 51, 54, 65, and 67). Out of the four commenters that opposed the proposal, one commenter pointed out that the proposal requiring the possession of a valid NRC license would restrict the availability of the conditional exemption to LLMW facilities that generate and store wastes on-site and that are already in possession of an NRC license (Commenter No. 16). This commenter suggested instead that the conditions of the exemptions should be such that any stored LLMW could qualify for the exemption, regardless of the source - “the storage exemption for LLMW should not be limited to LLMW that is generated at a facility that itself holds a NRC license, and then stored at the same facility.” Another commenter was critical of the language in the ANPR which suggested that conditional exemption was not an option for licensees who are not specifically licensed to manage radioactive wastes (Commenter No. 44). Two of the commenters who opposed the proposal stated that the proposal requiring possession of NRC licenses by LLMW facilities was redundant, since, by definition, generators are required to have a license to possess or use nuclear, or byproduct material by the NRC or Agreement State (Commenter Nos. 29 and 32).

5.2 Storage in Tanks, Containers, and Containment Buildings

Comment: A total of four commenters provided comments on the proposal to exempt on-site treatment of LLMW from RCRA hazardous waste regulations under the condition of storage of LLMW in tanks, containers, and containment buildings (Commenter Nos. 29, 31, 32, and 46). All four of the commenters endorsed the proposal. However, while all four of the commenters supported the proposal requiring storage of LLMW in tanks, containers, and containment as a condition for exemption from RCRA standards, one of the commenters recommended that the regulatory language be made more specific by adding further conditions to exemptions to address the type of storage units that must be used by the generator - e.g., containers, containment buildings, tanks, vaults, etc (Commenter No. 29).

5.3 Compliance with NRC/Agreement State Requirements

Comment: Six commenters provided comments to the Agency on the proposal requiring commercial LLMW facilities to be in compliance with NRC/Agreement State requirements as one of the conditions for exemption from RCRA hazardous waste requirements (Commenter Nos. 16, 17, 29, 32, 39, and 46). Five of the commenters opposed the proposal (Commenter Nos. 16, 17, 29, 32, and 39), while only one of the commenters supported it (Commenter No. 46). Of the five commenters who opposed the proposal, three commenters were of the view that the proposal requiring facilities to be in conformity with NRC/Agreement State requirements was redundant, since this was already a stipulation under the NRC or Agreement State license (Commenter Nos. 17, 29, and 32). One of the commenters contended that including the current proposal as a condition would create an "unnecessary burden" and would "provide no additional human or environmental protection"(Commenter No. 17). This view was echoed by another commenter who noted that the current proposal would place an excessive burden on LLMW facilities (Commenter No. 39). This commenter suggested that the exemption should only be based on the general requirements of the NRC or NRC Agreement State license; the owner/operator should not be held accountable for the level of compliance of the facility with the license or for failing to report releases or license violations. One commenter pointed out that the current proposal would restrict the availability of conditional exemptions to only those LLMW facilities that generate and store wastes on-site and that are already in possession of an NRC or NRC Agreement State license (Commenter No. 16). Or in other words, the proposal should be modified such that any LLMW facilities could qualify for the exemption, regardless of the source of generation of the waste.

5.4 Subject to Periodic NRC/Agreement State Inspections

Comment: A total of nine commenters provided comments to the Agency on the proposal requiring LLMW facilities to be subject to periodic NRC/Agreement State inspections as one of the conditions for exemption from RCRA hazardous waste requirements (Commenter Nos. 17, 19, 29, 32, 33, 40, 46, 51, and 60). Two commenters endorsed the proposal (Commenter Nos.19 and 46), while six of the commenters opposed it (Commenter Nos. 17, 29, 32, 33, 40, and 51).

One commenter suggested modifying the proposal (Commenter No. 60). Of the six commenters who opposed the proposal, three commenters contended that the inspection requirements are redundant since they are already included in the provisions of the NRC or Agreement State license (Commenter Nos. 17, 40, and 51). Another two commenters also pointed out the redundancy in the provisions; in their view, the inspection requirements are not necessary since They were unaware of any generators that were not already subject to periodic inspections (Commenter Nos. 29 and 32). One commenter from a trade group noted that all operating nuclear power plants have NRC on-site inspectors who conduct frequent and unannounced inspections, and nuclear power plants also have on-going quality assurance audits that are usually conducted by independent third parties to ensure regulatory compliance (Commenter No. 33). According to this commenter the nuclear power industry is one of the most stringently regulated industries in the country.

One commenter recommended modifying the proposal (Commenter No. 60). This commenter expressed concern that facilities that are subject to NRC inspections will be precluded from RCRA inspections. Instead, this commenter suggested that facilities that are granted a conditional exemption should also be subject to periodic RCRA inspections. Lastly, one commenter pointed out that the extent to which NRC inspection activities assure licensee compliance with requirements affecting mixed waste safety is a necessary consideration since the intensity of NRC inspection varies among the different types of licensees (Commenter No. 19). This same commenter suggested that exemptions should be granted to licensees which demonstrate a strong self-monitoring program, especially a quality assurance plan that meets the criteria of 10 CFR 50, Appendix B.

5.5 Management of Incompatible Wastes

Comment: Three commenters provided comments to the Agency on the proposal to include management of incompatible wastes by LLMW facilities as one of the conditions for exemptions from RCRA hazardous waste regulations (Commenter Nos. 15, 17, and 46). One of the commenters expressed support for the proposal (Commenter No. 46), while the other two opposed the proposal (Commenter Nos. 15 and 17). Both of the commenters who opposed the proposal pointed out the redundancy in the requirements. One of these commenters stated that the condition requiring management of incompatible wastes by the owner/operator of a LLMW facility was self-defeating, since the NRC and Agreement State license requirements already contained this provision (Commenter No. 17). The other commenter noted that current OSHA regulations also require separation of incompatible chemicals by the owner/operator; thus, including the above cited requirement would be redundant (Commenter No. 15).

5.6 Notification of any Changes to Facility or Procedures and Identification of Units

Comment: The Agency received comments from 22 commenters regarding the proposal to establish notification requirements for LLMW facilities applying for conditional exemption from

RCRA hazardous waste regulations (Commenter Nos. 15, 17, 19, 22, 24, 27, 28, 33, 34, 38, 40, 42, 44, 46, 51, 53, 54, 57, 58, 65, 66, and 67). Eleven commenters endorsed the proposal (Commenter Nos. 24, 27, 33, 40, 42, 51, 54, 65, 53, 58, and 67). Another seven commenters recommended modifications to the proposal (Commenter Nos. 19, 22, 28, 34, 38, 44, and 66), while four commenters opposed the proposal (Commenter Nos. 15, 17, 46, and 57).

Of the 11 commenters who endorsed the proposal requiring the owner/operator to notify the Agency within 90 days of using the LLMW (treatment or storage) unit for which conditional exemption is claimed, two commenters agreed that it was a reasonable requirement (Commenter Nos. 53 and 58). One of these commenters also noted that notification was essential to help prevent confusion regarding the regulatory status of a particular unit, particularly during an EPA inspection (Commenter No. 53). The other nine commenters contended that the proposal establishing the notification requirement and the proposal requiring the owner/operator to possess a valid NRC and Agreement State license are the only two conditions that are necessary to exempt facilities from RCRA regulations (Commenter Nos. 24, 27, 33, 40, 42, 51, 54, 65, and 67).

Of the seven commenters who suggested modifications to the proposal, four believed that the notification requirements should be kept as simple as possible (Commenter Nos. 19, 22, 28, and 66). One of these commenters suggested that the owner/operator could be asked to notify the NRC and furnish a copy of the original notice to the EPA within a specified time period (Commenter No. 28). Another commenter noted that exhaustive descriptions of unit structure, operating procedures and inventory programs would compromise the Agency's aim of reducing dual regulation (Commenter No. 66). Two of the commenters pointed out that the notification requirements contained in the proposal did not clearly define the term "unit" (Commenter Nos. 34 and 44). According to one of these commenters, a number of universities and other similar institutions store wastes in small containers; these containers may be more numerous than the numbers in nuclear power plants, but are typically much smaller in volume. If these institutions are subject to the same notification requirements as nuclear power plants, it would prove very burdensome and would not enhance human or environmental safety in any significant way. In the opinion of this commenter, the Agency needs to clarify the term "storage and treatment unit" in the proposal (Commenter No. 34). The other commenter recommended that the definition of "unit" be applied to waste in its final form (e.g., compacted into 55 gallon drums, combined into drums of liquid waste etc.) The final commenter who suggested modifications to the proposal, recommended that the notification requirements should also include notification of non-compliance by generators which become non-compliant (Commenter No. 38).

Of the four commenters who opposed the proposal, three stated that the proposal was self-defeating (Commenter Nos. 15, 46, and 57). One commenter pointed out that LLMW facilities require generators to have an RCRA identification number and this already serves the purpose of notification (Commenter No. 46). Another commenter expressed concern that if NRC is identified as the primary reporting agency it would only serve the purpose of dual regulation,

since facility designation is already covered in existing NRC licensing requirements (Commenter No. 57).

5.7 Violations

Comment: The Agency received comments from sixteen commenters regarding the proposal dealing with violations and the related proposal to include a reporting requirement as a condition of the exemption (Commenter Nos. 3, 8, 15, 16, 17, 19, 25, 37, 40, 42, 46, 51, 53, 58, 60, and 66). One commenter endorsed the overall proposal (Commenter No. 25), while seven commenters either sought clarifications about the proposal or suggested modifications to it (Commenter Nos. 3, 8, 16, 51, 53, 60, and 66). Eight commenters opposed the proposal (Commenter Nos. 15, 17, 19, 37, 40, 42, 46, and 58).

Of the seven commenters who sought clarifications about the proposal, four commenters were of the opinion that EPA should consider revocation of the conditional exemption only for serious or repeat violations, and especially in instances where environmental and health and safety issues were involved (Commenter Nos. 16, 51, 53, and 66). One commenter expressed concern that the requirement for reporting violations should not be established as a condition for revocation of exemption. In lieu of this provision, this commenter suggested adopting the RCRA framework, where paperwork or other permit violations do not immediately result in permit revocation (Commenter No. 51). Another commenter stressed that the proposal was not clear about what NRC non-compliance issue would result in loss of exemption (Commenter No. 53). A third commenter cautioned that under the current proposal, facilities could lose exemption for failure to report events of low environmental significance or storage "violations" that are below reporting thresholds in current EPA/ NRC regulations (Commenter No. 66). One federal government commenter felt that the loss of exemption was too severe a penalty for noncompliance with provisions of the NRC or Agreement State license, that are unrelated to any hazardous waste release events, or that are merely administrative in nature (Commenter No. 16). This commenter recommended, instead, that in cases where the owner/operator of a conditionally exempt facility becomes aware of a hazardous waste release or the threat of such a release, the reporting requirements could involve an oral report that has be made within 24 hours, and a written report to EPA with a copy to NRC, within 5 days of recognizing the danger. In addition, this commenter also suggested that EPA specify the content of written reports that will be required as a condition for exemption more precisely. He added that a general reference to NRC reporting requirements in 10 CFR part 20, subpart M could be confusing since the type of events that are designated in this regulation include thefts of licensed materials and radiation hazards to workers and public. Two commenters were unclear whether the conditional exemption should be revoked in instances where there the violation is identified internally by the owner/operator and corrected (Commenter Nos. 3 and 8). Finally, one commenter expressed reservations about the owner/operator notifying EPA of violations in all cases (Commenter No. 60). This commenter was also unclear about which agency would be responsible for monitoring compliance with the requirements.

Of the eight commenters who opposed the proposal, the majority, six of them, were of the opinion that notifications should be limited to events that are reportable under the conditions of the applicable NRC license (Commenter Nos. 15, 17, 19, 40, 47, and 58). One commenter stressed that the only reporting requirements necessary were the initial notification requirements of a facility claiming the conditional exemption (Commenter No. 47). Another commenter stated that the proposal would only increase the regulatory burden on facilities, since in their current form the RCRA regulations do not contain any requirements for reporting of violations.

5.8 Other Conditions are Necessary

Comment: A total of twenty commenters provided comments on the issue of whether additional conditions need to be included in the current list proposed by EPA for LLMW facilities to be exempt from RCRA hazardous waste regulations (Commenter Nos. 11, 15, 18, 23, 24, 27, 29, 32, 33, 36, 37, 38, 42, 45, 49, 51, 58, 60, 61, and 68). Six of the commenters believed that only one of the original conditions needed to be retained (Commenter Nos. 11, 18, 33, 42, 51, and 68), while another four commenters thought that two conditions were sufficient (Commenter Nos. 23, 24, 27, and 37). One commenter was opposed to the proposal for conditional exemption (Commenter No. 15). The remaining nine commenters had suggestions for additional conditions that could be added to the original list proposed by EPA (Commenter Nos. 29, 32, 36, 38, 45, 49, 58, 60, and 61).

Six of the commenters stated that the EPA should establish a single condition for granting a conditional exemption from RCRA, namely, the regulation of LLMW under a NRC or Agreement State license (Commenter Nos. 11, 18, 33, 42, 51, and 68). Another four commenters contended that in addition to the NRC license requirement, the condition of initial notification by the facility claiming the conditional exemption was also appropriate (Commenter Nos. 23, 24, 27, and 37). One commenter was opposed to the proposal for conditional exemption on the grounds that such a requirement would only increase the burden of dual regulation (Commenter No. 15).

Of the nine commenters who recommended new conditions to be added to the list, two commenters proposed that a condition requiring appropriate treatment and handling of mixed wastes be added to the list (Commenter Nos. 36 and 38). Two commenters stressed that exemptions for storage should be decided only based on compelling need (Commenter Nos. 29 and 32). In their opinion, situations under which conditional exemptions could be granted included: (a) where technology for treatment and disposal are inadequate and waste must be stored; (b) where wastes need to be stored for longer durations before they can accumulate in large enough quantities to be acceptable for treatment at treatment facilities; and, the owner/operator has a complete and verifiable chemical, physical and radiological characterization of wastes in storage. Another commenter echoed this concern and noted that only when there is no viable treatment or disposal facility available should wastes be allowed to be stored at a facility for more than a year (Commenter No. 45). One commenter pointed out that EPA needs to be aware of two other factors which have a bearing on the list of conditions, namely, the extent to which the NRC inspection activities monitor compliance with the license requirements and the

extent to which the owner/operator has implemented a quality assurance program at the facility ensuring that wastes are stored safely (Commenter No. 58). Another commenter offered a similar comment and stressed that the capabilities of the owner/operator to manage wastes and the level of training of the staff at the facility in accordance with OSHA and EPA requirements are also important considerations (Commenter No. 32). Another commenter suggested that the condition of exemption should require segregation of the waste by type and/or generator at the facility (Commenter No. 49). The same commenter also asserted that the duration of waste storage was a relevant criteria, since tanks and containers can deteriorate and the storage areas might turn into "de facto disposal units." To address this issue, this commenter recommended some kind of a limit on storage at LLMW facilities. A different commenter recommended that a specification of the type of storage units used by the generator, containers, containment buildings etc., could be added to the list of conditions (Commenter No. 32). Lastly, one commenter wanted to know whether these conditions will be codified or published (Commenter No. 60).

6. IMPLEMENTATION

6.1 Enforcement

Comment: We heard from 15 commenters concerning the first proposed enforcement alternative (Commenter Nos. 7, 15, 16, 29, 30, 32, 33, 36, 43, 53, 55, 60, 61, 63, and 66). Of these commenters, only one commenter specifically supported EPA's first enforcement alternative, which would subject non-compliant facilities to RCRA Subtitle C requirements from the time of non-compliance (Commenter No. 63). Another commenter did not specifically support the first alternative, but opposed the second alternative, arguing that EPA should retain and then delegate to states direct enforcement authority (Commenter No. 61). Several commenters offered arguments against the first enforcement alternative. These arguments included:

- An enforcement approach modeled on EPA's Munition's Rule would be redundant as applied to mixed waste regulated by NRC. The approach would only increase regulatory burden without increasing safety (Commenter No. 7).

- The first alternative defeats EPA's purpose in proposing a conditional exemption from RCRA Subtitle C requirements, which was to eliminate dual requirements (Commenter Nos. 15 and 55).

- Loss of conditional exemption is too severe a penalty for non-compliance with license provisions that are not related to hazardous constituent releases or are administrative in nature (Commenter No. 16).

- EPA enforcement in situations where a facility was already subject to NRC or Agreement State enforcement action would constitute double jeopardy for the facility (Commenter Nos. 29 and 32).

- Having LLMW revert to RCRA regulation will trigger additional requirements with which the facility will be unable to comply. The new approach will not help facilities gain relief from the current system of dual regulation (Commenter No. 33).

- Implementation of the first alternative would discourage NRC licensed facilities from taking advantage of the conditional exemption because they could be made subject to RCRA regulations through violations that did not result in threats to human health or the environment from hazardous constituents in the waste. (Commenter No. 66)

Other commenters recommended that if EPA selected an enforcement alternative similar to that in the Military Munitions rule, modifications be made for application to mixed wastes. These included:

- Preparation of specific guidance defining what form of violations would constitute a significant danger to human health or the environment with respect to the hazardous components of the waste (Commenter No. 43).

- Allowing a period of time (e.g., 60 to 90 days) during which a non-compliant facility could return to compliance without losing its RCRA exemption, provided that the facility could demonstrate that a release of LLMW is unlikely (Commenter Nos. 16, 30, and 53).

- Imposing no RCRA penalty if a facility returns to compliance within 30 days, especially if the violation is self-reported (Commenter No. 30).

- Allowing a facility to request in writing reinstatement of the exemption, with reinstatement automatic if EPA fails to take action on the request (Consistent with the Military Munitions rule) (Commenter No. 16).

- Limiting RCRA penalties where violations are minor, non-safety related infractions (Commenter No. 53).

One commenter opposed implementation of the first enforcement alternative generally, but argued that if EPA selects that alternative, it definitely should include provisions for automatic reinstatement of the exclusion if the Agency fails to take action on a request for reinstatement (Commenter No. 43). Another commenter was concerned that the enforcement and notification policy proposed in the first alternative would be adequate for storage situations, but not for "Treatment" situations (Commenter No. 36). Lastly, one commenter noted that under the first enforcement alternative, it was not clear who would be determining non-compliance, since the facility would be exempt from RCRA until a violation occurred. The commenter questioned whether facilities would report all violations if EPA depends on self reporting to identify non-compliers (Commenter No. 60).

We also heard from 28 commenters regarding the second proposed enforcement alternative (Commenter Nos. 7, 15-17, 19, 25, 27, 29, 32, 33, 36-38, 40, 42, 43, 45, 51-55, 57, 58, 65-67, and 69). Most of these commenters supported EPA's second enforcement alternative that would establish basic conditions for the exemption from RCRA Subtitle C (e.g., management in tanks and containers), but rely on NRC and the Agreement States for enforcement of the NRC license. (Commenter Nos. 7, 15-17, 19, 25, 27, 33, 37, 40, 42, 43, 51-54, 57, 65-67, and 69). Several of these commenters presented specific reasons for favoring the second alternative. These included:

- The second alternative would simplify implementation and reduce negative aspects of dual regulation and enforcement (Commenter Nos. 17, 52, and 69) .

- EPA should bring RCRA enforcement action only for violations to the conditional exemption that result in threats to human health and the environment from the hazardous waste constituents of the mixed waste (Commenter Nos. 27, 51, 53, and 65).
- NRC licenses often include procedural requirements that result in facilities being cited for paperwork violations. Such violations do not threaten human health (Commenter No. 66).

- EPA lacks the experience necessary to interpret or enforce NRC licensing requirements and regulations (Commenter Nos. 33, 51, and 66).

One commenter did not oppose deferment of EPA authority to NRC, but recommended that such a deferment not affect the authority of state agencies that currently regulate mixed waste facilities. This commenter argued that these state agencies have a closer understanding and knowledge of the compliance history at mixed waste facilities and should retain their regulatory authority (Commenter No. 36). Another commenter, a state nuclear safety agency, opposed reliance on NRC and Agreement States for enforcement, indicating that their agency did not have the expertise needed to regulate hazardous materials (Commenter No. 38). Another commenter recommended modifications to EPA's second enforcement alternative. This commenter recommended that conditions for exemption from RCRA be written into the NRC license in order to give NRC inspectors enforceable requirements and to provide for a time when EPA jurisdiction might need to be reasserted (Commenter No. 45).

Some commenters argued that NRC and Agreement States should be given complete authority over LLMW through an MOU (Commenter Nos. 15 and 55). These commenters argued that NRC license provisions are adequate to protect human health and the environment, and that having another agency involved in implementing mixed waste rules would provide no additional value. Under the terms of the MOU, NRC could be required to report information on the mixed waste program, just as the agency currently provides information on its other programs. One of these commenters also suggested that the terms of the MOU could require reporting of significant releases of LLMW to EPA (Commenter No. 15).

Lastly, a few commenters addressed the issue of when the conditional exclusion should be revoked. These commenters agreed that the conditional exclusion should be revoked only for violations of NRC regulations that are considered serious in nature (Commenter No. 54), or are repeat violations that jeopardize human health (Commenter Nos. 51 and 67). Two commenters proposed that any enforcement policy be written to ensure that there is no retroactive imposition of RCRA requirements and that any decisions regarding termination of a conditional exemption be based on documented risk. These commenters also recommended that a licensee whose exemption is terminated be given reasonable time to obtain required permits and otherwise come into compliance with RCRA requirements (Commenter Nos. 19 and 58). Two other commenters believed that EPA's enforcement alternatives were not clear enough for a meaningful evaluation and requested clarification of how the alternatives would work (Commenter Nos. 29 and 32). These commenters noted that the ramifications of the enforcement options on protection of human health and the environment, while difficult to determine, probably were not significant. These commenters also believed that the proposed approaches appear to provide minimal enforcement flexibility; they merely shift enforcement responsibilities from EPA to NRC with little impact on the directives contained in the regulation (Commenter Nos. 29 and 32).

6.2 Notification of Violations & Reporting

Comment: We heard from five commenters regarding the proposed requirements for initial notification that a facility has a storage or treatment unit for which it intends to claim a conditional exclusion (Commenter Nos. 7, 38, 53, 57, and 58). Of these five commenters, three agreed with this provision (Commenter Nos. 38, 53, and 58), while the other two commenters opposed the initial notification requirements (Commenter Nos. 7 and 57).

Comment: We heard from 19 commenters regarding the proposed requirements for initial notification and reporting of violations (Commenter Nos. 3, 7-9, 12, 15, 16, 22, 25, 28, 31, 38, 40, 42, 51, 53, 57, 58, and 60). Two commenters supported reporting of noncompliance with the conditions of the exemption (Commenter Nos. 25 and 38). One commenter agreed that any releases with potential for significant environmental impact should be reported to EPA as is currently required for radionuclides and other hazardous materials. This commenter suggested that significant releases of non-radioactive materials that exceed EPA reportability requirement also be directly reported to EPA (Commenter No. 15). Another commenter also supported the idea of a reporting requirement, but supplied a more detailed discussion of the issue in the event that EPA moves ahead with its first enforcement alternative. Assuming that full compliance with NRC standards and licensing requirements is not a condition of the exemption, the commenter recommended a two-part standard. First, reporting would be required for a violation of NRC or Agreement State requirements that results in a release to the environment of LLMW or creates a substantial threat of release. Second, reporting also would be required for failure to comply with exemption conditions, with an oral report to EPA within 24 hours if such failure results in an actual release from an exempt LLMW storage or treatment unit, and a written report to EPA (copy to NRC) within 5 days if there is a violation that results in an actual release or a substantial

threat of a release. This commenter concluded that only those violations that cause actual releases or threats of releases should be of concern (Commenter No. 16).

One commenter agreed with the proposed requirement for oral reporting within 24 hours for violations of the NRC license that results in endangerment to human health and the environment, noting that this provision is consistent with existing NRC requirements (Commenter No. 53). However, this commenter did not agree with the requirement for a written report within 5 days, noting that the standard NRC written report requirement is 30 days. The commenter recommends that reporting requirements be no more stringent than NRC requirements.

Three commenters suggested that reporting requirements for violations be similar to NRC report requirements in 10 CFR 20 (Commenter Nos. 3, 8, and 12). One commenter recommended following NRC reporting requirements in general, and argued that many of the benefits of the conditional exemption would be lost if new reporting requirements were added (Commenter No. 63). Three commenters also recommended that the NRC requirements prevail under a general exemption, noting that if a written report is required under NRC regulations for an event involving hazardous waste, a copy of the report could also be provided to EPA (Commenter Nos. 40, 42, and 58). One commenter noted that given NRC reporting requirements, additional reporting requirements imposed by EPA would constitute dual regulation and should not be included in the exemption (Commenter No. 57). One commenter recommended that licensees simply continue reporting over exposures or environmental releases to NRC, EPA, and OSHA as currently required (Commenter No. 15). This commenter noted that NRC has Memoranda of Understanding (MOUs) with EPA, OSHA, and DOT that allow it to notify these agencies of conditions or practices that they are better able to address. One commenter recommended that reporting requirement not simply reference NRC requirements (Commenter No. 16). The commenter noted that the NRC requirements define not just the content of the reports, but also the types of events requiring oral and written reports, as well as the timing of such reports following the event. The commenter believed that a general reference to the NRC requirements would be confusing, and instead recommended that EPA specify the contents of its required reports more precisely, either by referencing very specific parts of the NRC reporting requirements or by drafting its own specifications without referencing NRC requirements (Commenter No. 16).

We also heard from several commenters that specifically opposed the reporting requirement because the proposed reporting requirements would increase regulatory burden without resulting in any increases in safety (Commenter Nos. 7, 9, and 15). One of these commenters added that if EPA needs reporting to identify national trends, then NRC can supply EPA with summary or individual reports (Commenter No. 15). The commenter also suggested that the reporting requirement indicates that EPA is not confident that NRC can adequately regulate mixed waste, although there are no grounds for such a belief. We also heard from two other commenters that felt EPA should attempt to alleviate burdensome recordkeeping requirements in keeping with its recent trend in reducing paper requirements (Commenter Nos. 22 and 28). Another commenter specifically opposed a reporting requirement structured in a manner similar to that of the Military

Munitions rule. This commenter suggested that only major events, such as spills or releases that may pose a threat to human health or the environment, should require an oral report within 24 hours and a written report within 5 days. Whereas, certain minor non-compliance issues (e.g., administrative and paperwork violations) should simply be corrected by the facility operator (Commenter No. 31). Lastly, one commenter was concerned about EPA's reliance on voluntary reporting to identify non-compliance. The commenter suggested that it was questionable that all facilities would notify EPA if they violated the conditions of the exemption (Commenter No. 60).

6.3 Future Amendments to NRC/Agreement State Regulations

Comment: We heard from 11 commenters regarding future amendments to NRC/Agreement State requirements (Commenter Nos. 3, 25, 33, and 51). Four of these commenters believed that future changes in NRC regulation should have no adverse impact on EPA's requirements (Commenter Nos. 3, 25, 33, and 51). Three other commenters noted that NRC, like other regulatory agencies, periodically revises its requirements and noted that one requirement under Part 35, "Medical Use of By-Product Material," currently is under review (the time link for "Hold for Decay") (Commenter Nos. 29, 32, and 71). One of these commenters stated that the fact that NRC requirements are under review while EPA is proposing actions linked to NRC requirements demonstrates the need to plan for flexibility, rather than stipulating management of mixed waste based on current NRC requirements (Commenter No. 71).

Several other commenters, however, suggested that it is not possible at this time to predict what the likely impact of future NRC rule changes might be (Commenter Nos. 27, 29, and 32). One commenter indicated that to the extent that future NRC regulatory changes prompt EPA to consider revising or revoking its conditional exemption for LLMW, those issues would need to be addressed through a rulemaking process to ensure that all affected parties received proper notice and comment opportunities in the context of a factual setting (Commenter No. 27). Two commenters (Commenter Nos. 29 and 32) expressed the hope that EPA and NRC would continue to develop regulations for mixed waste in cooperation, in order to avoid problems like those currently experienced under the dual regulatory framework. Lastly, six commenters addressed issues of flexibility, noting that NRC requirements are performance-based and allow facilities significant flexibility in determining specifically how to meet requirements. These commenters argued that EPA should ensure that the provisions of its conditional exclusion do not interfere with facilities' ability to utilize future technologies for management of mixed waste (Commenter Nos. 27, 33, 37, 51, 54, and 67). One of these commenters also stated that the conditional exemption should not preclude a facility's ability to take advantage of any new NRC options regarding alternative management standards, such as long-term assured storage in lieu of traditional disposal (Commenter No. 51).

6.4 Roles of EPA Headquarters/Regions and NRC/Agreement States

Comment: We heard from 27 commenters regarding which agency should be responsible for ensuring the safe management of LLMW (Commenter Nos. 2, 3, 5, 7, 11, 15, 16, 17, 25, 27, 33, 37, 38, 40, 42-45, 51, 52, 54, 55, 57, 58, 65, 67, and 69). Two commenters did not express an opinion, other than that EPA should make it clear that only one agency has primacy at any time when dealing with a LLMW facility (Commenter Nos. 44 and 57). Most of the commenters, however, recommended that EPA rely on NRC or NRC Agreement States for enforcement of standards at sites with mixed waste (Commenter Nos. 2, 3, 7, 15, 16, 17, 25, 27, 33, 37, 40, 42, 43, 44, 51, 52, 54, 55, 57, 58, 65, 67, and 69). Many of these commenters based their support for NRC and Agreement State enforcement on their belief that NRC authority, regulatory requirements and enforcement performance demonstrate that NRC oversight would adequately protect human health and the environment. These commenters assert that additional EPA oversight would be redundant and therefore unnecessary (Commenter Nos. 7, 15, 17, 25, 27, 33, 51, and 55). One commenter stated that its state, Nebraska, is an Agreement State and has been very effective in bringing deficiencies to the commenter's attention and overseeing actions to correct those deficiencies (Commenter No. 25). Other commenters suggested that EPA lacked the experience necessary to adequately enforce NRC licensing provisions (Commenter Nos. 33 and 51). One commenter specifically recommended that NRC be the primary regulatory agency for waste undergoing DIS and on-site treatment because of added controls stemming from NRC and Agreement State licensing processes (Commenter No. 44). Another commenter supported NRC licensing of specific on-site mixed low-level radioactive waste treatments (Commenter No. 2). Two commenters recommended that EPA transfer the entire responsibility for regulating mixed waste to the NRC and Agreement States through a Memorandum of Understanding (MOU) (Commenter Nos. 15 and 55). One of these commenters noted that transfer of authority to one agency was the only way to avoid barriers (regulatory costs and commercial costs associated with disposal and treatment, and conflicting regulatory requirements) to minimizing generation and accumulation of mixed waste (Commenter No. 15).

Other commenters stressed the need for coordination between NRC and EPA and clear divisions of responsibility (Commenter Nos. 5, 11, and 45). One commenter recommended that conditions of the exemption be made part of the NRC or Agreement State license to ensure that NRC (and its Agreement States) would have sufficient authority to enforce the exemption and clear provisions for transferring authority back to EPA under appropriate circumstances (Commenter No. 45). Another commenter stated that the rule should make clear that NRC will not evaluate a licensee's compliance with the conditions established by EPA to qualify for the conditional exemption, unless those conditions are also license conditions or requirements under NRC's regulations (Commenter No. 5). Another commenter suggested that cooperation between the two agencies could include a co-inspection role for the first few years. The commenter argued that co-inspection might increase the comfort level of EPA in the early years of regulation, and that over time the role of the hazardous waste agencies in enforcing the rule would diminish (Commenter No. 11).

Many commenters, while favoring NRC and its Agreement States as primary enforcers of the mixed waste standards, noted specific roles for EPA in implementing the requirements. Several

commenters noted that it would be appropriate for EPA to step in to enforce requirements and handle violations where non-compliance endangered human health and the environment through releases of the hazardous components of the waste or where significant releases of non-radioactive materials that exceed EPA reportability requirements occur (Commenter Nos. 15, 43, 54, 65 and 67). One commenter recommended that EPA retain responsibility for ensuring compliance with those RCRA requirements that EPA deems appropriate for the storage of the hazardous component of mixed waste (Commenter No. 5). Another commenter listed very specific areas for EPA responsibility and recommended that these areas be included in exemption provisions. These areas included: use of approved containers, inspection schedules, fire suppression requirements, labeling, and placarding, as well as conditions derived from OSHA and DOT regulations such as requirements for the handling and storage of hazardous materials (Commenter No. 38). Two commenters recommended that EPA be the primary regulatory body for post-treatment and post-DIS wastes (Commenter Nos. 15 and 44). Similarly, another commenter recommended that should LLMW fall out of regulation by NRC, it could come under EPA jurisdiction (Commenter No. 67). One other commenter recommended that if EPA decides to implement an enforcement approach similar to that of the Military Munitions rule, it should develop specific guidance concerning the types of violations that would constitute a significant danger to human health or the environment with respect to the hazardous constituents of the waste. Without such guidance, the commenter asserts, there will be confusion regarding when loss of the exemption will occur (Commenter No. 43). Lastly, two commenters opposed granting NRC and its Agreement States primary enforcement authority concerning violations of mixed waste management requirements (Commenter Nos. 38 and 61). One of these commenters, a state nuclear safety agency, argued that its expertise was not in chemical safety, and that its licensing and inspection staff are not trained in the management of hazardous chemicals. Consequently, enforcing a conditional exemption would be outside the scope of the state agency's authority and expertise (Commenter No. 38).

7. DATA PROVIDED AS A RESULT OF ANPR

7.1 Generation of LLMW

Comment: Fourteen commenters provided information on the generation of LLMW (Commenter Nos. 10, 14, 15, 23, 25, 26, 28, 29, 31, 35, 38, 41, 57, and 71). Two commenters provided general information on the generation of LLMW, 11 commenters provided waste type information, nine commenters provided information on wastes volumes, and five commenters provided waste characterization data. Four commenters provided detailed data on the type and volume of LLMW generated at their facilities during the requested time period (See Exhibits 1-4) (Commenter Nos. 10, 23, 41, and 71). One of these commenters also included management and cost data (See Exhibit 2) (Commenter No. 10). One commenter presented summary data on the total amount of LLMW decayed and shipped off-site in the past three years (Commenter No. 57). The amount of decayed LLMW and LLMW shipped off-site because of a long half-life increased and the amount of LLMW shipped off-site with a short half-life decreased. The primary

hazardous chemicals in this waste were methanol, acetic acid, phenol, acetonitrile, chloroform and benzopyrene.

Two commenters indicated that research institutions generate microcurie amounts of low energy isotopes (Commenter Nos. 14 and 25). LLMW was typically in the form of scintillation vials, bulk solvents or labpack solvents, containing a variety of constituents depending on facility. One commenter (Commenter No. 38) asserted that 69% of the LLMW in storage in their state was solvents and other organic fluids. One commenter also noted that the bulk of the LLMW generated at their facility is scintillation cocktail waste containing tritium or carbon-14 and that other LLMW materials containing a variety of isotopes constitute approximately 2% of their annual generation rate (Commenter No. 71). One commenter stated that the majority of LLMW generated was flammable in nature and often in the form of flammable liquid scintillation cocktail and typically contained 14C, 3H, 32P, 35S, 125I, 131I, 45Ca, and 22Na (Commenter No. 25). One commenter generated approximately 3,000 cubic feet of LLMW per year at a cost of about $930,000 which included storage, treatment, and disposal (Commenter No. 31). One commenter shipped 13,800 pounds of scintillation counting media LLMW containing flammable and non-flammable solvents and millicuries of isotopes, and 150 pounds of other LLMW which contained various chemicals and millicuries of isotopes. Another commenter generated LLMW in volumes of 5 gallons or less and stated that the emphasis on mixed waste minimization in training courses has resulted in a decrease in the generation of LLMW (Commenter No. 29). One commenter has approximately 10 containers of less than one pound each of naturally occurring radioactive materials (Commenter No. 26).

Although one commenter was not a significant generator of mixed wastes, they had insufficient capability available to handle the mixed wastes within 90 days (Commenter No. 35). One commenter supported relief from the RCRA storage requirements as the contents pose no health and safety threat while stored and managed properly on-site (Commenter No. 28). This commenter indicated that they generally generated heavy metals type waste, the volume of which was in the cubic feet range and which had a very low level of radioactive activity. Another commenter asserted that RCRA wastes that would qualify for “Conditionally exempt small quantity generator” provisions of 261.5 may require a facility to obtain a Part B RCRA permit for storage when added to other hazardous wastes generated by a facility (Commenter No. 71). According to this commenter, the effect would be to create thousands of new RCRA permitted facilities. One of the commenters indicated that RCRA exemptions for LLMW would effect 90% of the radionuclides handled in their waste stream (Commenter No. 10).

7.2 Operating Procedures

Comment: Seventeen commenters provided information on operating procedures. Two of the seventeen commenters provided general information on operating procedures (Commenter Nos. 10, 14, 15, 23, 26, 28, 29, 31, 39, 41, 53, 57, 59, 65, 66, 67, and 71). One commenter (Commenter No. 29) described their comprehensive LLMW management program, consisting of characterization, analysis, decay-in-storage, blending of compatible wastes, treatment of low

halogen content aqueous layers, bulking of high halogen wastes and organic layers, and extensive recordkeeping.

Eight of the commenters described waste generating procedures. One commenter stated that there were no changes in the generation of vials, bulk solvents, or uranyl acetate wastes, although laboratories have been encouraged to substitute non-hazardous scintillation fluids for hazardous scintillation fluids (Commenter No. 23). This commenter's facility generated 110 55-gallon drums of scintillation vials, 5 drums of bulk solvents, and one drum of labpack solvents per year. One commenter packages waste, which must generally be shipped in 90 days, in metal drums, boxes, or roll-offs, labeled according to NRC and RCRA regulations (Commenter No. 28). Another commenter attributed the decrease in the generation of LLMW to the emphasis on mixed waste minimization in training courses (Commenter No. 29). One commenter noted that LLMW is typically generated in pharmaceutical research and development during the synthesis of radiolabelled compounds (Commenter No. 53). Another commenter, whose use of research radiochemicals results in small quantities of LLMW, is required to maintain a comprehensive waste minimization program that accommodates all forms of radioactive waste (Commenter No. 59). Two commenter's LLMW was the result of routine maintenance and equipment cleaning (Commenter Nos. 65 and 66). One of these commenters segregates their waste at the point of generation, inspects and sorts the waste per formal procedures, and stores the waste in selected close containers (Commenter No. 66). This commenter supported the RCRA exemption, claiming that controls imposed by EPA would not provide more protection than their current internal controls (i.e., inspections/surveys, internal/external reporting) necessary to meet the conditions imposed by their NRC license. One commenter described their radiation and control program which has 250 authorized users who supervise over 2000 radioactive material radiation workers in over 650 laboratories (Commenter No. 57).

Ten of the commenters provided information on waste storage procedures, five commenters described waste treatment procedures and six commenters discussed waste disposal procedures. One commenter accumulates materials with long half lives and ships them to a permitted facility every ninety days (Commenter No. 71). Another commenter stores LLMW indoors: bulk mixed waste in a Halon protected room and scintillation vials in a separate room (Commenter No. 23). These storage areas are inspected weekly. One commenter stores their LLMW as lab packs in RCRA-labeled, DOT-specification containers on containment pallets in their hazardous materials storage building (Commenter No. 26). Two commenters stored a majority of the waste they generated because of a lack of commercial treatment or disposal outlets (Commenter Nos. 31 and 65). One commenter ships waste to their own permitted storage facility (Commenter No. 67). One commenter is able to store mixed waste for one year before shipping for disposal, which limits them to decay-in-storage for mixed wastes with Rb-86 (Half-life = 18.65 days) and isotopes with shorter half-lives in order to allow for adequate operational margins (Commenter No. 41). Another commenter also is allowed to store mixed waste for a period of one year, which allows them to dispose of some mixed waste as hazardous waste only (Commenter No. 57). One commenter believed that a conditional exemption for the storage of LLMW would allow them to efficiently manage their small amount of LLMW (Commenter No. 14). Three commenters

disposed of their LLMW through incineration (Commenter Nos. 10, 23, and 26). One commenter developed Site Treatment and Disposal Plans outlining treatment and disposal facilities proposed for use, waste minimization efforts, rationale for waste characterization, uncertainties, and a proposed schedule for initiating treatment (Commenter No. 31). One commenter does not do any on-site treatment of LLMW (Commenter No. 41). One commenter is able to economically treat most LLMW in the form of solvents through an off-site vendor (Commenter No. 59). However, they are forced to store about 1,000 liters per year of their LLMW because treatment and disposal of these wastes according to current regulatory requirements is prohibitively expensive. One commenter has not been able to find any legal disposal options for their naturally occurring radioactive materials (Commenter No. 26). One commenter claimed that several nuclear power plants were required to obtain interim status to store LLMW and that they would have sent the LLMW off-site within the 90-day deadline if commercially-available treatment and storage were available (Commenter No. 39).

7.3 Cost Information

Comment: Fifteen commenters provided comment regarding cost information (Commenter Nos. 2, 10, 14, 15, 17, 20, 25, 26, 28, 29, 31, 32, 41, 59, and 65). One commenter provided general cost information which supported the RCRA exemption as it would remove the financial and regulatory barriers to treating mixed waste (Commenter No. 15). They asserted that disposal would be more economically viable.

Eleven commenters provided data on overall management costs. Of these commenters, ten provided support for the proposed rule and one commenter felt the NRC and Agreement States should have complete regulatory jurisdiction. One commenter asserted that the decay-in-storage program (which allows half-lives less than 120 days) saves millions of dollars per year and supported extension of the program to LLMW (Commenter No. 2). Without the decay-in-storage program, the commenter would have an additional $250,000 in costs per year. One commenter stated that RCRA exemptions for LLMW would effect 90% of the radionuclides in their waste stream (Commenter No. 10). Another commenter stated that a conditional exemption for the storage of LLMW would allow them to more efficiently manage their LLMW (Commenter No. 14). One commenter supported the conditional exemption and provided a breakdown of the mixed waste compliance costs for the nuclear utility industry (See Exhibit 5) (Commenter No. 17). One commenter claimed that they would see cost savings by not having to ship wastes every 90 days (Commenter No. 28). Two commenters stated the unit treatment and disposal costs for LLMW are extremely high and cost for on-site management is difficult to derive (Commenter Nos. 29 and 32). These commenters felt that the assessment of cost impacts should also consider indirect costs that may outweigh the direct costs of off-site disposal at commercial facilities. One commenter asserted that the current requirement for a RCRA Type B permit is an in surmountable economic barrier to reducing the hazard posed by LLMW and that the requirement to store mixed waste on site consumes limited resources (Commenter No. 59). One commenter generates approximately 3,000 cubic feet of LLMW per year at a cost of about $930,000 which includes storage, treatment, and disposal (Commenter No. 31). Another commenter estimated

their total costs associated with shipment and disposal of mixed waste from 1996 to April 1999 at $257,399 (Commenter No. 41).

One commenter discussed both storage costs and treatment costs and supported the conditional exemption (Commenter No. 28). This commenter spent over $100,000 to store 35,000 square feet of mixed waste with contained an average of 75 pico curies/gram of depleted uranium. The commenter estimated that an additional $2.9M may be required for treatment and disposal in the event the preferred treatment and disposal alternative is not available within the 180-day temporary storage authorization. The commenter also estimated that $20,000 or more would be saved if they were allowed to ship LLMW after accumulating an economic volume. Four commenters provided data regarding disposal costs (Commenter Nos. 20, 25, 26, and 65). One of these commenters is currently paying more than $310,000 in processing and disposal costs for 13 containers of LLMW (Commenter No. 20) . This corresponds to $4,100 per cubic foot versus $500-600 per cubic foot in disposal costs for wastes regulated by the NRC. The commenter also asserted introduction of legacy-liquid wastes to the radioactive liquid processing would save their customers close to $290,000 and that processing in-house is safer for the environment. Another commenter asserted that it costs $2,800 to dispose one gallon of mixed waste, versus less than $1.00 if it were handled through a RCRA facility as part of bulk handled waste (Commenter No. 25). The commenter also stated that the costs associated with disposal through an NRC-licensed facility is generally 50% less than disposal of similar non-radioactive waste through a RCRA-permitted facility. One commenter stated that disposal costs for LLMW range from approximately $250 to $750 per gallon for their facility, with a fifteen gallon minimum (Commenter No. 26) and another commenter stated that their disposal costs were upwards of $20-30,000 per drum (Commenter No. 65).

7.4 Offer to Generate Data/Other Sources of Data

Comment: Three commenters offered to either generate data or provide other sources of data (Commenter Nos. 21, 29, and 32). Two of these commenters noted that it would be helpful for the EPA to develop a standardized form for generators to complete (Commenter Nos. 21 and 29). One of these commenter also stated that the form should identify the Generator, Types of Mixed Waste, characteristics of LLMW, costs associated with management, and other pertinent information (Commenter No. 21). This commenter further noted that they would be willing to work with EPA on the development of this form.

One commenter stated that the existing data on mixed waste generation and management, from the National Survey and other non-periodic reports is inadequate (Commenter No. 29). This commenter indicated that a new method of obtaining mixed waste data needs to be established; which should include periodic surveys of all generators, uniform data collection methods and units of measure, and should not require any new forms or significantly increase the reporting and data management burdens on the generators. Finally, this commenter asserted that because of the scope of this request for cost data and additional complexities, additional time must be provided

to generators to gather information and make reasonable estimates of the costs incurred by the many radiation programs around the country.

Two commenters indicated that EPA should not request reporting of liquid volume in gallons and other data in units/liter (Commenter Nos. 29 and 32). They further stated that metric and non-metric units should not be mixed and federal agencies should be conducted exclusively in metric units to comply with applicable laws and executive orders. These commenters also noted that EPA should review documentation concerning LLMW generation and management gathered and published by the Department of Energy's Low-Level Waste Management Program.

7.5 USWAG's Rulemaking Petition

Comment: Five commenters provided information on USWAG's Rulemaking Petition (Commenter Nos. 15, 26, 33, 43, and 51). Two of the commenters supported USWAG's rulemaking petition (Commenter Nos. 26 and 33). One commenter did not support USWAG's rulemaking petition (Commenter No. 15). Two commenters offered conditional support of the petition (Commenter Nos. 43 and 51). One of these commenters supported the petition if it includes all LLMW generators regardless of size or industry segment (Commenter No. 43). The other commenter supported the maintenance of the original USWAG rulemaking petition pending finalization of the conditional exclusion for management of mixed waste and further development of the Agency's mixed waste disposal policies (Commenter No. 51).

One commenter noted that while USWAG's request will lead to improved management of mixed waste and removes conflict in EPA regulatory requirements that are impossible to comply with, the USWAG request is insufficient to resolve the current impasse on minimizing mixed waste and safely reducing the hazards of mixed waste (Commenter No. 15). The commenter recommended that EPA transfer licensing and enforcement responsibility to the NRC and Agreement States through a Memorandum of Understanding.

Another commenter indicated that the management techniques at Washington University (tracking, labeling, storage, etc.,) would allow the proposed tiered hierarchy system to work cost effectively and still protect human health and the environment (Commenter No. 26). Another commenter stated that they will maintain their original rulemaking petition pending finalization of the conditional exemption for management of mixed waste and further development of the Agency's mixed waste disposal policies (Commenter No. 33).

7.6 Impacts of Proposed Exemptions

Comment: Twenty commenters provided information on the impacts of proposed exemptions (Commenter Nos. 2, 3, 4, 8, 10, 12, 14, 15, 20, 26, 27, 29, 32, 41, 53, 57, and 60). Sixteen of these commenters supported the proposed exemptions (Commenter Nos. 2, 3, 4, 8, 10, 12, 14, 15, 26, 41, 53, 57, 60, 63, 65, and 66). Three other commenters offered their conditional support

of the proposed exemptions (Commenter Nos. 20, 29, and 32) and one commenter did not support the proposed exemptions (Commenter No. 27).

One commenter stated that granting a conditional exemption from RCRA regulations will result in less handling of hazardous wastes and fewer waste shipments (Commenter No. 2). The commenter further noted that without decay in storage it would cost them $250,000 each year without improvements in health and safety. Other commenters indicated that the proposed action would not result in any diminishment to safety of the public, the environment, or their employees (Commenter Nos. 3 and 8). Three commenters noted that this action would be of great benefit to the pharmaceutical industry and medical research organizations (Commenter Nos. 3, 8, and 12). Another commenter stated that the proposed changes would allow treatment in storage vessels at any time after generation of the waste (Commenter No. 4). Two commenters noted that the exemptions would contribute to mixed waste minimization and decrease radiation exposures to personnel and transporters (Commenter Nos. 10 and 26).

Another commenter asserted that a conditional exemption for storage of LLMW would allow them to more efficiently manage their small volume of LLMW (Commenter No. 14). One commenter indicated that the primary impact of the proposed RCRA exemption would be to remove the financial and regulatory barriers to treating mixed waste (Commenter No. 15). This commenter further noted that the proposed exemption should cause waste management practices to change emphasis from storage and monitoring to treatment and safe disposal, and would enable generators to convert mixed waste in storage to low level radioactive waste and other hazardous waste, under an NRC or Agreement State license. The commenter also indicated that the RCRA exemption will reduce the LLMW inventory, increase the amount of storage space, and minimize the need to dispose of mixed waste. Another commenter stated that there would be significant cost savings if the three proposed conditional exemptions were allowed (Commenter No. 41). The commenter further stated that current EPA regulations impose unnecessary risk and unnecessarily expose mixed waste disposal workers to radioactive materials by imposing the disposal of mixed waste. One commenter noted that they have conducted pre-treatment of ignitable LLMW streams and that it would have been expensive to dispose of in a LLMW incinerator and were able to save approximately $500,000 in a single year using other methods (Commenter No. 53). Another commenter stated that the exemption allowing for the decay-in-storage of mixed waste would benefit research and medicine by greatly reducing the cost for waste disposal, and may reduce risk to the general public (Commenter No. 57). Three commenters indicated that reducing the number of redundant regulations promotes better understanding by the licensee and better compliance (Commenter Nos. 60, 65, and 66). Another commenter noted that an advantage is created by applying the exemption to LLMW stored while decaying because it will reduce the burden and cost associated with RCRA storage requirements (Commenter No. 63). The commenter further noted that commercial facilities will not pass on to the generators any cost savings.

One commenter questioned whether the exemption for on-site treatment will provide the same level of environmental protection as currently provided (Commenter No. 20). Another

commenter stated that the decay-in-storage exemption would be of very limited value to nuclear power facilities, and should not be considered as a substitute of a general conditional exemption for all LLMW subject to NRC requirements (Commenter No. 27). Two commenters noted that while the regulatory changes described in the ANPR will improve management of stored wastes they fail to address the primary regulatory problems that have forced generators to store these wastes in the first place (Commenter Nos. 29 and 32). These commenters further noted that the net effect of the proposed regulatory changes was difficult to predict.

EXHIBITS

EXHIBIT 1

Mixed Waste Generation at Stanford University, 3/96 through 3/99

		RCRA Codes	Activity in microcuries (rounded to whole number)													Volumes (lbs)	
			3H	14C	35S	125I	CA45	CD109	CR51	FE55	NP237	P33	32P	232U	238U	3 years	per/ year
1	Scintillation Cocktails																
	(A) Flammable (Xylene, toluene, pseudocumene)	D001, F003	1,867	1,942	9,239	1,144	5	100	270	1,060	0	607	7,973	23		23,599	7,899
	(B) Toxic	N/A		50										50		167	56
2	Uranyl Acetate Wastes																
	(A) With Lead Citrate (aq)	D008													5	5	2
	(B) With Hydrochloric Acid	D002													1	0	0
	(C) With Lead Citrate and Ethanol	D008													2	9	3
	(D) With Acrylamide, Formaldehyde, Dimethylsulfoxide	N/A	1												2	1	0
	(E) With Osmium Tetroxide	P087, D004													2	12	4
	(F) With Heptane/ Toluene/ Acetone	D001, F003													1	8	3
	(G) With Methanol	D001, F003													1	2	1
	(H) With Acetone/ Ethanol/ propylene oxide	D001, F003													1	1	0
3	Phenol Solutions																

EXHIBIT 1 (Continued)

		RCRA Codes	Activity in microcuries (rounded to whole number)													Volumes (lbs)	
			3H	14C	35S	125I	CA45	CD109	CR51	FE55	NP237	P33	32P	232U	238U	3 years	per/ year
	(A) With sodium acetate buffer	N/A	101													4	1
4	Acidic Wastes																
	(A) Acetic Acid w/Enhance (2,5-dimethyl-2,5-hexanediol)	D002	1													1	0
	(B) Dilute Trichloroacetic Acid	D002	2,010		1,700										1	41	14
5	Solvent Wastes																
	(A) Heptane/ Methanol/ Chloroform	D001	1,041	1,000	10											51	17
	(B) Acetonitrile	D001		10												4	1
	(C) Hexane/Propanol	D001	6,041	60												166	55
	(D) Toluene	D001	240													16	5
	(E) Other Organic Solvents	D001	3,520	100												60	20
6	Aqueous Toxics																
	(A) alpha-amanatin	N/A	240													11	4
	(B) dibutyl pthalate	N/A								15						1	0
	Total		15,062	3,162	10,949	1,144	5	100	270	1,075	0	607	7,973	73	16	24,159	8,066
	Non-Scintillation Waste Totals		13,195	1,170	1,710	0	0	0	0	15	0	0	0	0	16	393	131

EXHIBIT 2

The following mixed wastes were generated at Duke University during the period requested

Shipment Date	Waste Codes	Waste Type	Waste Class	Number of Drums	Isotopes	Amount (mCi)
5-20-96	D001, F003, F005	Vials	Low level	21	C-14	0.997
					S-35	0.31
					H-3	8.95
					P-32	2.49
					I-125	0.0021
					Ca-45	0.12
7-15-96	D001, F003, F005	Vials	Low level	17	C-14	0.69
					Ni-63	0.042
					H-3	6.9
					P-32	1.03
					S-35	0.77
					I-125	0.0056
					P-33	0.002
7-15-96*	D001, F003	Vials	Low level	1	H-3	0.5625
10-16-96	D001, F003, F005	Vials	Low level	34	P-32	4.22
					H-3	13.23
					S-35	0.98
					I-125	0.498
					C-14	0.8727
					Ca-45	0.023
10-16-96*	D001, F003	Vials	Low level	1	H-3	1.875
***Shipped from Duke University HLA laboratory (CESQG) at 2 University Place, Durham, NC 27707**						

EXHIBIT 2 (Continued)

Shipment Date	Waste Codes	Waste Type	Waste Class	Number of Drums	Isotopes	Amount (mCi)
12-16-96	D001, F003, F005	Vials	Low level	20	H-3	8.49
					C-14	0.177
					P-32	3.335
					I-125	0.95
					S-35	0.12
7-11-96	D001, F003, D022	Bulk Solvents	Low level	1	H-3	79.42
					C-14	0.723
					I-125	0.987
					S-35	0.336
2-25-97	D001, F003, F005	Vials	Low level	18	H-3	7.018
					C-14	0.834
					P-32	3.35
					S-35	1.04
					Ca-45	0.084
					I-125	0.0013
5-1-97	D001, F003, F005	Vials	Low level	10	H-3	2.6349
					C-14	0.5282
					Ca-45	0.009
					P-32	.03942
					I-125	0.0035
					Ni-63	0.008
					S-35	0.162
					P-33	0.1

EXHIBIT 2 (Continued)

Shipment Date	Waste Codes	Waste Type	Waste Class	Number of Drums	Isotopes	Amount (mCi)
7-11-97	D001, F003, F005	Vials	Low level	25	H-3	2.03
					C-14	0.25
					P-32	2.55
					I-125	0.0075
					P-33	0.001
					I-131	0.0001
					Ni-63	0.0083
7-28-97	D001, F003, F005	Vials	Low level	4	H-3	0.74
					C-14	0.003
					P-32	0.0081
					I-125	0.006
					S-35	0.015

Shipment Date	Waste Codes	Waste Type	Waste Class	Number of Drums	Isotopes	Amount (mCi)
9-16-97	D001, F003, F005	Vials	Low level	17	H-3	7.62
					C-14	1.519
					P-32	3.39
					S-35	2.07
					I-125	0.735
					I-131	0.001
					Ca-45	0.022
9-16-97	D001, D008, F003	Labpack Solvents	Low level	3	U-238	0.8025

EXHIBIT 2 (Continued)

Shipment Date	Waste Codes	Waste Type	Waste Class	Number of Drums	Isotopes	Amount (mCi)
9-16-97	D001, F003, F005	Vials	Low level	17	H-3	7.62
9-16-97	D001, D022, F003, F005	Bulk Solvents	Low level	1	H-3	3.079
					C-14	5.16
					P-32	15.31
					S-35	1.0
11-25-97	D001, F003, F005	Vials	Low level	14	H-3	7.26
					C-14	0.0322
					P-32	0.636
					I-125	0.016
					I-131	0.001
					S-35	0.117

EXHIBIT 3

ATTACHMENT 1

LLMW Generation and Management
LLMW Cost Data

Mixed Waste Generated
1996, 1997, 1998

Shipment Date/ Type of Waste	RCRA Code	Hazardous Constituents	Total Hazardous Waste	Hazardous Waste (gal)	Hazardous Waste Concentration (1 gal = 3.79 liter 1 mCi = 109 pCi)	Storage and Treatment Techniques	Disposal Practice	Disposal Costs
Legacy	Dioxin F027	Dioxin H-3	Dioxin 70 mg H-3 --- 0.0146 mCi	0.018	1.00 E6 mg/l 2.08 E8 pCi/l	20 ml container	-	-
4/11/96 Limited Quantity Radioactive Material	D001	Ethanol H-3 P-32	Ethanol 2.24 E6 mg H-3 --- 0.5571 mCi P-32 --- 0.0159 mCi	5	1.7 E5 mg/l 2.94 E7 pCi/l 8.39 E5 pCi/I	5 gal bucket - Ship within 90 days	Incineration at permitted facility	$4,000/5 gal bucket
2/19/97 Liquid Scintillation Media	D001 F003 F005 D022	Toluene Methanol Acetonitrile Methylene Chloride H-3 C-14	Toluene 2.0 E4 mg Methanol 2.3 E5 mg Acetonitrile 3.4 E6 mg Methylene Chloride 5.0 E3 mg H-3 --- 5.11531 mCi C-14 --- 1.049997 mCi	30	176 mg/l 2.0 E3 mg/l 3.0 E4 mg/l 44 mg/l 4.37 E7 pCi/l 9.0 E5 pCi/l	55 gal drum - Ship within 90 days	Incineration at permitted facility	$400/55 gal drum

EXHIBIT 3 - Attachment 1 (Continued)

Shipment Date/ Type of Waste	RCRA Code	Hazardous Constituents	Total Hazardous Waste	Hazardous Waste (gal)	Hazardous Waste Concentration (1 gal = 3.79 liter 1 mCi = 109 pCi)	Storage and Treatment Techniques	Disposal Practice	Disposal Costs
4/30/97 Liquid Scintillation Media	D001 D022 F003 F005	Methanol Xylene Acetonitrile Ethanol Chloroform Acetone Phenol THF Isoamyl Alcohol H-3 C-14	Methanol 4.0 E5 mg Xylene 9.0 E6 mg Acetonitrile 2.5 E6 mg Ethanol 8.4 E6 mg Chloroform 1.6 E6 mg Acetone 6.0 E5 mg Phenol 9.0 E5 mg THF 1.0 E4 mg Isoamyl Alcohol 1.2 E5 mg H-3 --- 0.86 mCi C-14 --- 0.27 mCi	8.5	1.2 E4 mg/l 2.8 E5 mg/l 7.8 E4 mg/l 2.6 E5 mg/l 5.0 E4 mg/l 1.9 E4 mg/l 2.8 E4 mg/l 310 mg/l 4.0 E3 mg/l 2.6 E7 pCi/l 8.15 E7 pCi/l	30 gal drum - Ship within 90 days	Incineration at permitted facility	$1,200/30 gal drum
7/23/97 Liquid Scintillation Media	D001 F003	Methanol Acetonitrile H-3 C-14	Methanol 3.0 E5 mg Acetonitrile 3.0 E5 mg H-3 --- 0.00459 mCi C-14 --- 0.00038 mCi	2	3.9 E4 mg/l 3.9 E4 mg/l 6.06 E5 pCi/l 5.03 E4 pCi/l	5 gal bucket - Ship within 90 days	Incineration at permitted facility	$100/5 gal bucket
10/17/97 Liquid Scintillation Media	D001 F003 F005	Toluene Xylene H-3	Toluene 1.07 E7 mg Xylene 1.02 E mg H-3 --- 0.04059 mCi	9	3.0 E5 mg/l 3.0 E5 mg/l 1.19 E6 pCi/l	55 gallon drum - Ship within 90 days	Incineration at permitted facility	$325/55 gal drum

Shipment Date/ Type of Waste	RCRA Code	Hazardous Constituents	Total Hazardous Waste	Hazardous Waste (gal)	Hazardous Waste Concentration (1 gal = 3.79 liter 1 mCi = 109 pCi)	Storage and Treatment Techniques	Disposal Practice	Disposal Costs
1/14/98 Liquid Scintillation Media	D001 F003	Methanol Xylene Acetonitrile H-3 C-14 I-125 S-35	Methanol 3.5 E6 mg Xylene 1.8 E7 mg Acetonitrile 1.89 E7 mg H-3 --- 4.1576 mCi C-14 --- 0.0398 mCi I-125 --- 1.0191 mCi S-35 --- 0.0546 mCi	30	3.1 E4 mg/l 1.6 E5 mg/l 1.7 E5 mg/l 3.66 E7 pCi/l 3.5 E5 pCi/l 7.0 E6 pCi/l 4.8 E5 pCi/l	30 gal drum - Ship within 90 days	Incineration at permitted facility	$300/30 gal drum
4/8/98 Liquid Scintillation Media	D001 F003 D022	Xylene Chloroform Methanol Acetonitrile H-3 C-14	Xylene 3.3 E6 mg Chloroform 5.0 E5 mg Methanol 3.69 E5 mg Acetonitrile 7.7 E5 mg H-3 --- 0.02 mCi C-14 --- 0.07 mCi	30	2.9 E4 mg/l 4.0 E4 mg/l 3.0 E3 mg/l 7.0 E3 mg/l 1.76 E5 pCi/l 6.16 E5 pCi/l	30 gal drum - Ship within 90 days	Incineration at permitted facility	$220/30 gal drum

Shipment Date/ Type of Waste	RCRA Code	Hazardous Constituents	Total Hazardous Waste	Hazardous Waste (gal)	Hazardous Waste Concentration (1 gal = 3.79 liter 1 mCi = 109 pCi)	Storage and Treatment Techniques	Disposal Practice	Disposal Costs
9/10/98 Liquid Scintillation Media	D001 F003 D022	Acetonitrile Acetone Methanol Carbon disulfide Pyridine Chloroform Phenol H-3 S-35	Acetonitrile 2.5 E7 mg Acetone 8.5 E5 mg Methanol 8.5 E5 mg Carbon disulfide 1.5 E6 mg Pyridine 1.5 E6 mg Chloroform 1.0 E4 mg Phenol 1.0 E4 mg H-3 --- 0.25996 mCi S-35 --- 0.04416 mCi	12	5.5 E5 mg/l 1.9 E4 mg/l 1.9 E4 mg/l 3.3 E4 mg/l 3.3E4 mg/l 219.9 mg/l 219.9 mg/l 5.68 E6 pCi/1 9.64 E5 pCi/l	30 gal drum - Ship within 90 days	Incineration at permitted facility	$250/30 gal drum

EXHIBIT 4 - Attachment A

Generation of Mixed Waste at the University of Missouri-Columbia
1994-February 1999

Source*	Description	Volume (gal)	RCRA IDS	Isotopes
Oil changes (A54)	Waste Oil (B206)	2.36	D098**	H-3
				S-35
				Tc-99
Laboratory Wastes (A94)	Aqueous waste w/ low solvents (B101)	6.10	D001	S-35
			F003	
Laboratory Wastes (A94)	Aqueous waste w/ low other toxic organics (B102)	0.75	D001	H-3
			D009	S-35
Laboratory Wastes (A94)	Spent acid w/ metals (B103)	1.00	D002	C-14
			D007	
Laboratory Wastes (A94)	Acidic aqueous waste (B105)	9.00	D002	C-14
			F003	
Laboratory Wastes (A94)	Spent caustic (B109)	1.00	D002	S-35
Laboratory Wastes (A94)	Caustic aqueous waste (B110)	4.00	D002	S-35
Laboratory Wastes (A94)	Other aqueous waste with low dissolved solids (B114)	2.42	D005	Ag-110m
			D007	C-14
			D008	Cr-51
			D009	H-3
			D011	Rb-86
				U-238

Laboratory Wastes (A94)	Concentrated solvent-water solution (B201)	1583.80	D001	Au-198
			D002	C-14
			D009	Ca-45
			D011	Ce-144
			D022	Cs-137
			D098	H-3
			D099	I-125
			F002	Ir-192
			F003	Mn-54
			F005	P-32
			U220	P-33
				Re-186
				Re-188
				Rh-105
				S-35
				Sc-46
				Se-75
				Tc-99
				Tc-99m
				U-238
				W-181
				W-185

				W-188
				Zn-65
Laboratory Wastes (A94)	Halogenated (e.g., chlorinated) solvent (B202)	1.61	D019	C-14
			D022	S-35
			F003	Tc-99
				W-188
Laboratory Wastes (A94)	Nonhalogenated solvent (B203)	296.21	D001	Ag-110m
			D002	C-14
			D004	H-3
			D009	I-125
			D010	P-32
			D022	P-33
			F002	Re-186
			F003	Re-188
			F004	Rh-105
			F005	S-35
				Se-75
				Tc-99
				Tc-99m
Laboratory wastes (A94)	Halogenated/nonhalogentated solvent mixture (B204)	36.83	D001	Ag-110m
			D002	Au-198
			D019	C-14

			D022	Co-60
			F002	H-3
			F003	I-125
			F005	P-32
				S-35
				Sc-46
				Tc-99
				Tc-99m
Laboratory Wastes (A94)	Waste Oil (B206)	9.10	D098	Co-60
				Eu-152
				Eu-154
				H-3
				Tc-99
				Zn-65
Laboratory Wastes (A94)	Other organic liquids (B219)	0.25	D005	C-14
			F003	
			P070	
Laboratory Wastes (A94)	Spent soild filters or adsorbents (B310)	29 lbs	D001	H-3
NOTES:				
* Origin code and System Type: 1 The hazardous waste was generated on site from a production process, service activity or routine cleanup				
	(including off-specification or spent chemicals). The waste sources and waste descriptions are listed in the table			
** Missouri Department of Natural Resources code or used oil not destined for recycling				

EXHIBIT 4 - Attachment B

Shipments for Disposal of Mixed Waste from the University of Missouri-Columbia
1996 - April 1999

Item	Volume	RCRA IDS	Isotope	Activity	
	(Gal)			(MCi)	(uCi/ml)
Shipment 1					
A1	14	D001	H-3	0.185	3.5E-03
		F003	Fe-55	0.003	5.7E-05
A2	30	D001	H-3	0.17	1.5E-03
		D022	C-14	0.019	1.7E-04
		F002			
		F003			
A3	30	D001	H-3	0.692	6.1E-03
		D009	C-14	0.05	4.4E-04
		D002	Na-22	0.011	9.7E-05
		F003			
A4	30	D001	H-3	2.236	2.0E-02
		D022	C-14	0.416	3.7E-03
		F003			
A5	30	D001	H-3	1.042	9.2E-03
		D022	C-14	0.015	1.3E-04
		F003			
		F005			
A6	30	D001	H-3	3.477	3.1E-02

Item	Volume	RCRA IDS	Isotope	Activity	
	(Gal)			(MCi)	(uCi/ml)
		D010	C-14	0.5	4.4E-03
		D002			
		F003			
		F005			
A7	30	D001	H-3	1.569	1.4E-02
		D022	C-14	0.205	1.8E-03
		F003			
A8	30	D001	H-3	0.968	8.5E-03
		D022	C-14	0.041	3.6E-04
		F003			
A9	30	D001	H-3	0.6	5.3E-03
		F003	C-14	0.15	1.3E-03
A10	30	D001	H-3	0.678	6.0E-03
		F003			
A11	30	D001		1.177	1.0E-02
		D022		0.35	3.1E-03
		F003			
A12	30	D001		1.258	1.1E-02
		F003		0.252	2.2E-03
		F005		0.602	5.3E-03

Item	Volume	RCRA IDS	Isotope	Activity	
	(Gal)			(MCi)	(uCi/ml)
				0.001	8.8E-06
A13	30	D001		0.75	6.6E-03
		D022		0.037	3.3E-04
		F003			
A14	30	D001	H-3	0.582	5.1E-03
		D022	C-14	0.053	4.7E-04
		F003			
A15	30	D001	H-3	2.677	2.4E-02
		D002	C-14	0.787	6.9E-03
		D022	S-35	0.018	1.6E-04
		F003			
A16	30	D001	H-3	29.544	2.6E-01
		D022	C-14	5.122	4.5E-02
		F002			
		F003			
A17	30	D001	S-35	0.548	4.8E-03
		D022			
		F003			
A18	30	D001	H-3	1.504	1.3E-02
		D005	C-14	0.957	8.4E-03

Item	Volume	RCRA IDS	Isotope	Activity	
	(Gal)			(MCi)	(uCi/ml)
		D022	S-35	0.5	4.4E-03
		F002			
		F003			
		F005			
		P070			
A19	30	D001	I-125	0.104	9.2E-04
		D009			
		F003			
A20	30	D001	S-35	113.057	1.0E+00
		F003			
Shipment 2					
B1	18	D001	Tc-99	11.1	1.6E-01
		D019			
		D022			
		D098			
		F002			
		F003			
		F005			
B2	26	D001	H-3	3.5037	3.6E-02
		D098	C-14	0.7278	7.4E-03

Item	Volume	RCRA IDS	Isotope	Activity	
	(Gal)			(MCi)	(uCi/ml)
		F002	S-35	0.0768	7.8E-04
		F003			
		U220			
B3	22	D001	S-35	2.031	2.4E-02
		D022			
		D098			
		F003			
B4	1.5	D001	Tc-99	0.914	1.6E-01
		D022			
		F003			
B5	16	D001	I-125	1.3573	2.2E-02
		F003			
B6	55	D001	H-3	0.022	1.1E-04
		D009			
		D022			
		F002			
		F003			
		F005			
B7	55	D001	H-3	0.012	5.8E-05
		D010			

Item	Volume	RCRA IDS	Isotope	Activity	
	(Gal)			(MCi)	(uCi/ml)
		D022			
		F003			
		F005			
B8	55	D001	H-3	0.05	2.4E-04
		D022	C-14	0.013	6.2E-05
		F003			
		F005			
B9	55	D001	H-3	0.014	6.7E-05
		D022			
		F003			
B10	55	D001	H-3	0.009	4.3E-05
		F003			
B11	55	D001	H-3	0.004	1.9E-05
		F003			
B12	30	D001	H-3	0.001	8.8E-06
Shipment 3					
C1	30	D001	S-35	1.82	1.6E-02
C2	30	D001	I-125	0.055	4.8E-04
		D009			
		F003			

Item	Volume	RCRA IDS	Isotope	Activity	
	(Gal)			(MCi)	(uCi/ml)
C3	30	D001	H-3	0.781	6.9E-03
		D022	C-14	0.907	8.0E-03
		D098	S-35	0.005	4.4E-05
		F003			
		F005			
		U220			
C4	30	D001	H-3	1.339	1.2E-02
		D005	C-14	0.956	8.4E-03
		D022	S-35	0.001	8.8E-06
		F002			
		F003			
		F005			
		P070			
C5	11	D001	H-3	0.025	6.0E-04
		F003	C-14	0.007	1.7E-04
		F005			
C6	7.7	D001	H-3	0.194	6.7E-03
		F003	C-14	0.012	4.1E-04
		F005			
C7	0.1	D001	Ag-110m	2.00E-09	5.3E-09

Item	Volume	RCRA IDS	Isotope	Activity	
	(Gal)			(MCi)	(uCi/ml)
		D022			
C8	1	F005	Ca-45	0.002	5.3E-04
C9	1	D001	Ce-144	5.00E-09	1.3E-09
C10	0.25	D001	U-238	1.00E-08	1.1E-08
C11	0.12	D001	Cs-137	9.00E-07	2.0E-06
		F002			
		F003			
		F005			
C12	1.5	D001	Ir-192	0.041	7.2E-03
		F003			
C13	0.15	F003	Se-75	0.01	1.8E-02
C14	0.1	F003	Zn-65	5.00E-06	1.3E-05
C15	0.1	D098	Co-60	0.0007	1.8E-03
C16	0.1	D001	Cs-137	3.00E-07	7.9E-07
		D011			
		D022			
		F002			
		F003			
C17	0.1	D001	Ag-110m	2.00E-09	5.3E-09
		D022			

Item	Volume	RCRA IDS	Isotope	Activity	
	(Gal)			(MCi)	(uCi/ml)
		F002			
		F003			
C18	0.06	D001	W-181	0.004	1.8E-02
		D022	W-185	0.004	1.8E-02
		F002			
		F003			
		F005			
C19	1	D001	Ir-192	0.0001	2.6E-05
C20	0.15	D001	Sc-46	0.0002	3.5E-04
			W-188	0.0001	1.8E-04
C21	0.13	F003	Se-75	0.01	2.0E-02
C22	0.5	D022	Cl-36	0.25	1.3E-01
		F003			
C23	0.1	D001	Se-75	0.001	2.6E-03
C24	2	D001	Se-75	0.001	1.3E-04
		F003			
C25	1	D010	Se-75	0.001	2.6E-04
		F003			
C26	0.25	D001	Co-60	4.00E-09	4.2E-09
		D022			

Item	Volume	RCRA IDS	Isotope	Activity	
	(Gal)			(MCi)	(uCi/ml)
		F003			
C27	0.1	D001	Sc-46	4.00E-09	1.1E-08
		D019			
		D022			
C28	0.1	D019	W-188	4.00E-07	1.1E-06
		D022			
C29	0.81	D001	Mn-54	4.00E-09	1.3E-09
C30	0.5	D001	Ca-45	0.108	5.7E-02
C31	0.08	D001	Cs-137	7.00E-07	2.3E-06
		F002			
C32	0.12	F003	Se-75	0.001	2.2E-03
C33	0.1	F003	Ca-45	0.06	1.6E-01
C34	0.13	F003	W-188	2.00E-05	4.1E-05
C35	0.13	D001	Se-75	0.001	2.0E-03
		D004			
		D010			
		F003			
C36	1	D002	Se-75	0.001	2.6E-04
		F003			
C37	1	D098	Co-60	0.0007	1.8E-04

Item	Volume	RCRA IDS	Isotope	Activity	
	(Gal)			(MCi)	(uCi/ml)
			Eu-152	0.0009	2.4E-04
			Eu-154	0.0009	2.4E-04
			Zn-65	0.001	2.6E-04
C38	0.01	D001	Ir-192	0.001	2.6E-02
C39	0.5	D003	H-3	0.267	1.4E-01
			C-14	0.04	2.1E-02
C40	24	D005	H-3	5.168	5.7E-02
		D007	C-14	0.423	4.7E-03
		D009			
		P070			
C41	0.1	D009	Cr-51	0.07	1.8E-01
			Hg-203	0.021	5.5E-02
C42	0.13	D007	Ag-110m	3.00E-05	6.1E-05
		D011			
C43	0.13	D011	Tc-99	0.1	2.0E-01
C44	0.01	D008	U-238	3.80E-05	1.0E-03
C45	1	D006	Mn-54	0.008	2.1E-03
Shipment 4 (being prepared)					
D1	8.5	D001	C-14	3.80E-03	1.2E-04
		D002			

Item	Volume	RCRA IDS	Isotope	Activity	
	(Gal)			(MCi)	(uCi/ml)
		F003			
D2	10.5	D001	S-35	11.62	2.9E-01
		D022			
		F003			
D3	13.2	D001	H-3	1.07	2.1E-02
		D022	C-14	1.32	2.6E-02
		F002			
		F003			
		F005			
		U002			
		U022			
D4	6.7	D001	Ca-45	0.02	7.9E-04
		D022	I-125	0.88	3.5E-02
		F002	Se-75	2.91E-06	1.1E-07
		F003	Tc-99	1.13E-02	4.5E-04
		F005	U-238	1.00E-04	3.9E-06
		U002	W-181	8.20E-05	3.2E-06
			W-185	3.10E-05	1.2E-06
			Zn-65	4.80E-04	1.9E-05
D5	6.62	D008	I-125	0.11	4.4E-03

Item	Volume	RCRA IDS	Isotope	Activity	
	(Gal)			(MCi)	(uCi/ml)
		D009	U-238	2.80E-04	1.1E-05
D6	1.67	D003	Ca-45	0.42	6.6E-02
		D006			

EXHIBIT 5

MIXED WASTE COSTS*

Direct Cost of Obtaining RCRA Storage Permit

Permitting Steps	Outside Consultants and Attorneys	Employee Time
Part A Application	$75,000	1,5000 hrs = $47,000
Part B Application	$150,000	2,000 hrs = $69,000
Corrective Action Investigation	$300,000	500 hrs = $19,000
Permitting Costs	$525,000	$135,000

O & M Costs to Comply with Duplicative RCRA TSD Regulations

Activities	Direct Expenditures	Employee Time
Training, Recordkeeping, Design and Construction of Storage Facilities, Inspections, etc.	Initial training course $6,600 for preparation by outside consultant. Cost of Construction for Mixed Storage Unit Fence: $9,000. Original construction cost for space occupied by Mixed Waste Storage Unit: $340,000.	Training time: $21,000 for initial training: 600 hrs w/ instructor and 23 students $6,000/yr Refresher training: 180 hrs (annual). Time spent by employees on RCRA inspections by state environmental protection agency 120 hrs $5,000. Weekly waste inspection, recordkeeping and other RCRA Compliance activities: 900 hrs $35,000
Treatment & Disposal	$200,000 to date for treatment of 16 drums of wastes (Price quotes for additional treatment as high as $1390/gal)(proposals for as much as $78,000 per drum or $2605/gallon)	Technical support for shipping of mixed waste: 40 hrs = $1,500
Capital and O & M Costs	$555,600	$68,500
Permitting Costs Capital and O & M Costs Subtotals =	$525,000 $555,600 $1,080,600	$135,000 $68,500 $203,500
Total of Major Mixed Waste Compliance Costs = $1.28 Million (1 Station) **Nuclear Utility Costs Estimated at $91.2 Million (Extrapolation for 71 Sites)**		

*** Rough estimate of expected RCRA permitting and O & M costs.**

EXHIBIT 6

Commenters by Comment Identification Number

Commenter Id. Number	Commenter
1	University of Minnesota
2	The University of Virginia
3	Hoffmann-La Roche Inc.
4	Permafix
5	U.S. Nuclear Regulatory Commission
7	University of California
8	Johnson & Johnson
9	American College of Nuclear Physicians/Society of Nuclear Medicine
10	University of Nebraska Medical Center
11	State of Washington Department of Health
12	Novartis Institute for Biomedical Research
13	Health Physics Society
14	The Rockefeller University
15	CORAR
16	The Department of Energy
17	Nuclear Energy Institute
18	BWX Technologies, Inc.
19	Detroit Edison
20	Alliant Utilities
21	ACURI
22	Department of the Army
23	Duke University Medical Center
24	Texas Utilities Services
25	University of Nebraska-Lincoln
26	Washington University School of Medicine
27	Arizona Public Service Company
28	U.S. Army Center for Health Promotion and Preventative Medicine
29	Environmental Protection Branch and the Radiation Safety Branch of the Division of Safety, Office of Research Services of the National Institutes of Health
30	Lawrence Livermore National Laboratory
31	USEC
32	American Chemical Society
33	Utility Solid Waste Activities Group, The Edison Electric Institute, The American Public Power Association, The National Rural Electric Cooperative Association
34	University of Delaware
35	Exxon Chemical Americas
36	Washington State Department of Ecology (Ecology), Nuclear Waste Program
37	Ameren Services
38	State of Illinois Department of Nuclear Safety
39	The Michigan Department of Environmental Quality
40	Southern California Edison

EXHIBIT 6 (Continued)

Commenter Id. Number	Commenter
41	University of Missouri-Columbia
42	Southern California Edison
43	Westinghouse Electric Company
44	Academic and Medical Radiation Safety Officers Group
45	Envirocare of Utah, Inc.
46	Bayer Corporation
47	Texas Department of Health, Bureau of Radiation Control
48	S.E. Logan and Associates, Inc.
49	Texas Natural Resource Conservation Commission
50	The Idaho Division of Environmental Quality
51	Duke Power Company
52	The University of Wisconsin Madison
53	Merck & Co., Inc.
54	PECO Nuclear
55	Mallinckrodt Inc.
57	University of Cincinnati
58	Lipton, William V.
59	NEN Life Science Products, Inc.
60	New York State Department of Environmental Conservation
61	State of Utah, Department of Environmental Quality Division of Solid and Hazardous Waste
62	State of Tennessee, Department of Environment and Conservation
63	GlaxoWellcome
64	State of Washington Department of Health
65	Commonwealth Edison Company
66	SIEMENS Power Corporation
67	Tennessee Valley Authority
68	Washington Public Power Supply System
69	Massachusetts Department of Environmental Protection
70	LA DEQ
71	Stanford University
72	The National Association of College and University Business Officers (NACUBO) and the American Council on Education (ACE)

EXHIBIT 6 (Continued)

Commenters by Comment Name

Commenter Name	Commenter Id. Number
Academic and Medical Radiation Safety Officers Group	44
ACURI	21
Alliant Utilities	20
Ameren Services	37
American Chemical Society	32
American College of Nuclear Physicians/Society of Nuclear Medicine	9
Arizona Public Service Company	27
Bayer Corporation	46
BWX Technologies, Inc.	18
Commonwealth Edison Company	65
CORAR	15
Department of the Army	22
Detroit Edison	19
Duke Power Company	51
Duke University Medical Center	23
Envirocare of Utah, Inc.	45
Environmental Protection Branch and the Radiation Safety Branch of the Division of Safety, Office of Research Services of the National Institutes of Health	29
Exxon Chemical Americas	35
GlaxoWellcome	63
Health Physics Society	13
Hoffmann-La Roche Inc.	3
Johnson & Johnson	8
LA DEQ	70
Lawrence Livermore National Laboratory	30
Lipton, William V.	58
Mallinckrodt Inc.	55
Massachusetts Department of Environmental Protection	69
Merck & Co., Inc.	53
NEN Life Science Products, Inc.	59
New York State Department of Environmental Conservation	60
Novartis Institute for Biomedical Research	12
Nuclear Energy Institute	17
PECO Nuclear	54
Permafix	4
SIEMENS Power Corporation	66
Southern California Edison	40
Southern California Edison	42
Stanford University	71
State of Illinois Department of Nuclear Safety	38
State of Tennessee, Department of Environment and Conservation	62

EXHIBIT 6 (Continued)

Commenter Name	Commenter Id. Number
State of Utah, Department of Environmental Quality Division of Solid and Hazardous Waste	61
State of Washington Department of Health	11
State of Washington Department of Health	64
S.E. Logan and Associates, Inc.	48
Tennessee Valley Authority	67
Texas Department of Health, Bureau of Radiation Control	47
Texas Natural Resource Conservation Commission	49
Texas Utilities Services	24
The Department of Energy	16
The Idaho Division of Environmental Quality	50
The Michigan Department of Environmental Quality	39
The National Association of College and University Business Officers (NACUBO) and the American Council on Education (ACE)	72
The Rockefeller University	14
The University of Virginia	2
The University of Wisconsin Madison	52
University of California	7
University of Cincinnati	57
University of Delaware	34
University of Minnesota	1
University of Missouri-Columbia	41
University of Nebraska-Lincoln	25
University of Nebraska Medical Center	10
USEC	31
Utility Solid Waste Activities Group, The Edison Electric Institute, The American Public Power Association, The National Rural Electric Cooperative Association	33
U.S. Army Center for Health Promotion and Preventative Medicine	28
U.S. Nuclear Regulatory Commission	5
Washington Public Power Supply System	68
Washington State Department of Ecology (Ecology), Nuclear Waste Program	36
Washington University School of Medicine	26
Westinghouse Electric Company	43

EXHIBIT 6 (Continued)

Commenters by Organization Type

Organization Type	Commenter Id. Number	Commenter Name
Academia	1	University of Minnesota
	2	The University of Virginia
	7	University of California
	11	Stanford University
	14	The Rockefeller University
	25	University of Nebraska-Lincoln
	26	Washington University School of Medicine
	34	University of Delaware
	41	University of Missouri-Columbia
	52	The University of Wisconsin Madison
	57	University of Cincinnati
Commercial TSDFs	4	Permafix
	45	Envirocare of Utah, Inc.
Contractor/Vendor	18	BWX Technologies, Inc.
	31	USEC
	43	Westinghouse Electric Company
	48	S.E. Logan and Associates, Inc.
	66	SIEMENS Power Corporation
Federal - DOE	16	The Department of Energy
	30	Lawrence Livermore National Laboratory
Federal - NRC	5	U.S. Nuclear Regulatory Commission
Federal - Other	22	Department of the Army
	28	U.S. Army Center for Health Promotion and Preventative Medicine
	29	Environmental Protection Branch and the Radiation Safety Branch of the Division of Safety, Office of Research Services of the National Institutes of Health
Hospitals/Medical	3	Hoffmann-La Roche Inc.
	10	University of Nebraska Medical Center
	12	Novartis Institute for Biomedical Research
	23	Duke University Medical Center
	53	Merck & Co., Inc.
	55	Mallinckrodt Inc.
	59	NEN Life Science Products, Inc.
	63	GlaxoWellcome
Industrial Uses	8	Johnson & Johnson
	35	Exxon Chemical Americas
	46	Bayer Corporation

EXHIBIT 6 (Continued)

Organization Type	Commenter Id. Number	Commenter Name
Nuclear Power Plants	19	Detroit Edison
	20	Alliant Utilities
	24	Texas Utilities Services
	27	Arizona Public Service Company
	37	Ameren Services
	40	Southern California Edison
	42	Southern California Edison
	51	Duke Power Company
	54	PECO Nuclear
	65	Commonwealth Edison Company
	67	Tennessee Valley Authority
	68	Washington Public Power Supply System
Public	58	Lipton, William V.
State Government	11	State of Washington Department of Health
	36	Washington State Department of Ecology (Ecology), Nuclear Waste Program
	38	State of Illinois Department of Nuclear Safety
	39	The Michigan Department of Environmental Quality
	47	Texas Department of Health, Bureau of Radiation Control
	49	Texas Natural Resource Conservation Commission
	50	The Idaho Division of Environmental Quality
	60	New York State Department of Environmental Conservation
	61	State of Utah, Department of Environmental Quality Division of Solid and Hazardous Waste
	62	State of Tennessee, Department of Environment and Conservation
	64	State of Washington Department of Health
	69	Massachusetts Department of Environmental Protection
	70	Louisiana Department of Environmental Quality

EXHIBIT 6 (Continued)

Organization Type	Commenter Id. Number	Commenter Name
Trade Groups/Law Firms	9	American College of Nuclear Physicians/Society of Nuclear Medicine
	13	Health Physics Society
	15	CORAR
	17	Nuclear Energy Institute
	21	ACURI
	32	American Chemical Society
	33	Utility Solid Waste Activities Group, The Edison Electric Institute, The American Public Power Association, The National Rural Electric Cooperative Association
	44	Academic and Medical Radiation Safety Officers Group
	72	The National Association of College and University Business Officers (NACUBO) and the American Council on Education (ACE)